

IRRIGATION : IDAHO

FARMS AND ACREAGE IRRIGATED, IRRIGATION WORKS, COST OF CONSTRUCTION, COST OF OPERATION AND MAINTENANCE,
AND CROPS IRRIGATED

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INTRODUCTION.

This bulletin presents the larger part of the statistics of irrigation for Idaho obtained in connection with the Thirteenth Census. These data, with additional information, will be embodied in a special report of the Census of Irrigation and in the final reports of the Thirteenth Census. The statistics of the number of farms and acreage irrigated, cost of operation and maintenance, and irrigated crops are for the calendar year 1909; those of irrigation works, cost of enterprises, acreage enterprises were capable of irrigating in 1910, and acreage included in projects are of the date July 1, 1910.

These statistics have been collected under the law of February 25, 1910, which contained the following clause relating to irrigation:

Inquiries shall also be made as to the location and character of irrigation enterprises, quantity of land irrigated in the arid region of the United States and in each state and county in that section under state and Federal laws; the price at which these lands, including water rights, are obtainable; the character and value of crops produced on irrigated lands, the amount of water used per acre for said irrigation and whether it was obtainable from national, state, or private works; the location of the various projects and methods of construction, with facts as to their physical condition; the amount of capital invested in such irrigation works.

The information called for by this law which could be supplied by farm operators was obtained on supplemental schedules by the regular census enumerators as a part of the agricultural census. The remaining data, which were supplied by the owners or officials of irrigation enterprises, were obtained on special schedules by special agents. The data relating to number of farms irrigated and irrigated crops are taken from the supplemental schedules, while all data relating to acreage irrigated and to irrigation works and their construction and operation are taken from the special schedules.

In accordance with the law, the data collected have been classified primarily by the state and Federal laws by virtue of which the land was brought under irrigation. The results are presented in detail at the end of this bulletin and summarized in text tables.

Such of the terms used as are not self-explanatory are defined below.

Farms irrigated.—The number of "farms irrigated" is the number of farms on which irrigation is practiced and is equivalent to the term "number of irrigators" used in previous census reports.

Types of enterprise.—The types of enterprise under which the lands irrigated in 1909 are classified are as follows:

United States Reclamation Service enterprises, which operate under the Federal law of June 17, 1902, providing for the construction of irrigation works with the receipts from the sale of public lands.

United States Indian Service enterprises; which operate under various acts of Congress providing for the construction by that service of works for the irrigation of land in Indian reservations.

Carey Act enterprises, which operate under the Federal law of August 18, 1894, granting to each of the states in the arid region 1,000,000 acres of land on condition that the state provide for its irrigation, and under amendments to that law granting additional areas to Idaho and Wyoming.

Irrigation districts, which are public corporations that operate under state laws providing for their organization and management, and empowering them to issue bonds and levy and collect taxes with the object of obtaining funds for the purchase or construction, and for the operation and maintenance of irrigation works.

Cooperative enterprises, which are controlled by the water users under some organized form of cooperation. The most common form of organization is the stock company, the stock of which is owned by the water users.

Commercial enterprises, which supply water for compensation to parties who own no interest in the works. Persons obtaining water from such enterprises are usually required to pay for the right to receive water, and to pay, in addition, annual charges based in some instances on the acreage irrigated and in others on the quantity of water received.

Individual and partnership enterprises, which belong to individual farmers or to neighboring farmers, who control them without formal organization. It is not always possible to distinguish between partnership and cooperative enterprises, but as the difference is slight this is unimportant.

Source of water supply.—Of the terms used in the classification according to source of water supply, none requires explanation except "reservoirs." The only reservoirs which are treated as independent sources of supply are those filled by collecting storm water or from watercourses that are ordinarily dry. When reservoirs are filled from streams or wells, the primary source is considered the source of supply.

Acre-foot.—The "acre-foot," used to express the capacity of reservoirs, is the volume of water required to cover 1 acre to a depth of 1 foot, or 43,560 cubic feet.

Cost.—The cost of irrigation enterprises is that given by the owners. For the larger works the cost given is taken, in most cases, from the books of account and represents the actual cost. In the case of most of the private and partnership and many of the cooperative enterprises, however, the works were built by their owners without records of money or labor expended, and the cost given represents the owners' estimates. The cost reported for 1910 includes the cost of construction and of acquiring rights. The latter usually consists of filing fees only. In some instances it includes the purchase price of rights, but these cases are so rare that they are unimportant. The cost reported for 1899 is designated "cost of construction," but probably includes the cost of acquiring rights, as in 1910. The average cost per acre is based on the acreage enterprises were capable of irrigating in 1910 and the cost to July 1, 1910.

FARMS AND ACREAGE IRRIGATED.

Irrigation of any importance is confined almost wholly to the southern half of the state, although but one county, Latah, reports no irrigation. The central portion of the state is mountainous and is occupied very largely by national forests, while the northern portion is also mountainous or rolling and receives sufficient rainfall to mature most crops without irrigation. Of the land irrigated in 1909, 89 per cent lies in the valley of the Snake River, which extends across the state from east to west and forms the western boundary for about two-fifths of the length of the state. The location of the irrigated lands of the state

is indicated in a general way by the accompanying maps, which show in which class each county falls, with reference to the percentage which irrigated land is of the total land area and the percentage which irrigated farms are of all farms.

The following table shows the number of farms and acreage irrigated in comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms for the state, and the areas not yet irrigated for which water has been or is being made available:

	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Number of all farms.....	¹ 30,807	² 17,471	13,336	76.3
Approximate land area of the state..... acres.	53,346,560	53,618,560	.....	.....
Land in farms..... acres.	¹ 5,283,604	² 3,204,903	2,078,701	64.9
Improved land in farms..... acres.	¹ 2,778,740	² 1,413,118	1,365,622	96.6
Number of farms irrigated.....	³ 16,439	⁴ 9,188	7,251	78.9
Acreage irrigated.....	³ 1,430,848	⁴ 608,718	822,130	135.1
Acreage enterprises were capable of irrigating.....	⁵ 2,388,959	⁶ 1,343,500	1,040,459	77.2
Acreage included in projects.....	⁵ 3,549,573	(⁷)	.....	.....
Percentage irrigated of—				
Number of all farms.....	53.4	52.6	0.8	.....
Approximate land area of the state.....	2.7	1.1	1.6	.....
Land in farms.....	27.1	19.0	8.1	.....
Improved land in farms.....	51.5	43.1	8.4	.....
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909.....	958,111	⁸ 739,782	218,329	29.5
Excess of acreage included in projects over acreage irrigated in 1909.....	2,118,725	(⁷)	.....	.....

¹ Apr. 15, 1910. ² June 1, 1900. ³ In 1909. ⁴ In 1899. ⁵ In 1910. ⁶ Reported under ditch in 1899. ⁷ Not reported.
⁸ Represents difference between acreage irrigated and acreage under ditch in 1899.

Number of farms irrigated.—The number of farms irrigated is made up of the number reported on the supplemental schedules by the regular enumerators, together with an estimate of the number of farms covered by enterprises which were reported by special agents but not by the regular enumerators. This estimate was based upon the average acreage irrigated per farm shown by the supplemental schedules. According to the figures presented in the table, irrigation was practiced on slightly more than one-half (53.4 per cent) of the farms of the state in 1909. In 1899 the proportion of irrigated farms was slightly lower, 52.6 per cent, while in 1889 the proportion was 65.5 per cent. It is evident that between 1889 and 1899 the number of unirrigated farms in the state increased more rapidly than the number of irrigated farms. During the last decade, however, the rate of increase in the number of irrigated farms has been approximately the same as that in the number of unirrigated farms.

Of the 23 counties in the state, 14 report as many as half their farms irrigated, 2 others report as many as 45 per cent, and 1 other county reports more than 31

per cent of its farms irrigated. There are only 5 in which less than 15 per cent of the farms are reported irrigated, and there is only 1 from which irrigation is not reported. The last-mentioned counties are all in the northern part of the state, whereas the counties which have a large proportion of farms irrigated are in the southern part. In 2 counties the irrigated farms form more than 90 per cent of the whole number of farms, and in 4 others more than 85 per cent, the maximum proportion of irrigated farms being 92.9 per cent in Twin Falls County.

From 1899 to 1909 the increase in the number of farms irrigated was 78.9 per cent for the entire state. Only 5 counties, all in the southern part of the state, show a higher rate of gain. Lincoln County, the territory forming Cassia County in 1899 and Cassia and Twin Falls Counties in 1909, and Canyon County show the greatest increase, 733.1, 298.4, and 164.9 per cent, respectively. These are the counties in which the large Carey Act and United States Government enterprises are located. In 3 counties, the boundaries of which have not been changed, decreases in the number of farms irrigated are shown.

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In each of these counties there was an increase in the acreage irrigated, suggesting the possibility of a difference in the interpretation by enumerators in the two censuses as to what should constitute a farm, but apparently indicating an increase in the acreage irrigated per farm.

Acreage irrigated.—The acreage irrigated is taken from special schedules filled out by agents from information obtained from owners or officials of irrigation enterprises and, in some instances, from public records. This acreage is considerably larger than the acreage shown by the supplemental schedules obtained by the farm enumerators. This is due to several causes. The special agents found enterprises for which no schedules had been returned by the enumerators, indicating that the acreage reported on the supplemental schedules is short to some extent. On the other hand, there is a natural tendency for the officials of enterprises to report as irrigated the entire area of farms of which only a part was irrigated, and in some sections farms are so situated as to receive water from more than one ditch, and may be reported as irrigated by both, causing duplication. It has been impossible to eliminate the duplication or to determine its extent. Owing to the causes just enumerated, it is probable that the acreage reported irrigated is excessive, but the extent of the excess can not be determined. It is believed, however, that this does not exceed 10 per cent for the state of Idaho.

The total acreage reported as irrigated in 1909 was 1,430,848 acres, against 608,718 acres in 1899 and 217,005 acres in 1889. The acreages given for 1899 and 1909 include land lying in Indian reservations, while that for 1889 does not, but the acreage irrigated in reservations is so small as not to change the general effect of the comparison. The percentage of increase from 1889 to 1899 was 180.5, while from 1899 to 1909 it was 135.1. The absolute increase during the latter decade was, however, 822,130 acres, and that between 1889 and 1899 was only 391,713 acres.

The percentage of increase in the acreage irrigated was considerably higher than the percentage of increase in the number of farms irrigated. This indicates, again, that there was an increase in the acreage irrigated per farm, the average being 87 acres in 1909, as compared with 66 acres in 1899. During the same period the average size of farms in the state decreased from 183.4 acres to 171.5 acres. This fact, taken in connection with the increase in the acreage irrigated per farm, emphasizes the fact that farmers are irrigating larger parts of their holdings than formerly. The same tendency is shown by the increase in the percentage of the total improved farm acreage that is irrigated. In 1899 this proportion was 43.1 per cent and in 1909 it was 51.5 per cent.

The percentage of the total land area of the state irrigated in 1909 was 2.7, compared with 1.1 per cent in 1899 and 0.4 per cent in 1889.

Both in 1909 and 1899 the county for which the largest acreage of irrigated land was reported was Fremont, the number of acres being 303,163 and 102,745, respectively. Three other counties each show areas of irrigated lands exceeding 100,000 acres in 1909, while three more each have over 80,000 acres irrigated.

The county in which irrigated land forms the highest percentage of the total is Canyon, where 16.2 per cent of the land area is irrigated. In only one other county, Ada, is the proportion higher than 10 per cent. In the counties having the largest irrigated areas, Fremont and Bingham, there are also large areas of mountainous land and lava plains, and the proportions that the irrigated lands form of the total area are only 7.9 and 7.4 per cent, respectively.

Acreage included in projects.—The table shows that in 1910 existing enterprises were ready to supply water to 958,111 acres not irrigated in 1909. Even after allowance is made for an increase in the area irrigated in 1910 over that in 1909, it is probable that there remained at the close of 1910 as much land under ditch but not irrigated as had been brought under irrigation in the 10 years from 1899 to 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 2,118,725 acres, which is about two and one-half times the acreage brought under irrigation in the last decade and about one and one-half times the total area irrigated in 1909. This acreage represents the area which will be available for the extension of irrigation in the next few years upon the completion of the projects now under construction. It indicates in a general way the area available for settlement, although much of this unirrigated land is in farms already settled.

Acreage irrigated, classified by character of enterprise.—The next table gives a distribution of the acreage irrigated in 1909 according to the character of the enterprise controlling the irrigation works. In Ada and Canyon Counties a large part of the land irrigated is in irrigation districts which control their own works but receive their water from the United States Reclamation Service. This acreage has been credited to the districts irrigating it before the Reclamation Service began operations in these counties. In Twin Falls County a large enterprise built under the Carey Act has been turned over to the water users since 1909, but is credited to the Carey Act company controlling it at that time. In Fremont County a large enterprise supplying water for hire has been transferred to an irrigation district since these data were collected, but is credited to the commercial enterprise formerly controlling it.

CHARACTER OF ENTERPRISE.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All classes	1,430,848	100.0
U. S. Reclamation Service.....	47,500	3.3
U. S. Indian Service.....	3,426	0.2
Carey Act enterprises.....	162,418	11.4
Irrigation districts.....	140,930	9.8
Cooperative enterprises.....	628,102	43.9
Commercial enterprises.....	44,872	3.1
Individual and partnership enterprises.....	403,600	28.2

Irrigation districts, cooperative enterprises, and individual and partnership enterprises are all controlled by the water users. These supply 81.9 per cent of the acreage irrigated. United States Reclamation Service and Carey Act enterprises, which are to be turned over to the water users, supply 14.7 per cent of the acreage irrigated. An area of 27,000 acres supplied by a commercial enterprise at the time these data were collected has since been formed into an irrigation district. It appears, therefore, that when the Reclamation Service and Carey Act enterprises are all turned over to the water users, only a very small percentage of the land

irrigated will be supplied by works which are not controlled by the water users. The cooperative enterprises, which supply water for 43.9 per cent of the land irrigated, are principally stock companies, of which the stock is owned by the water users.

Acreage irrigated, classified by source of water supply.—The following table shows the distribution of the acreage irrigated according to the source of water supply:

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources.....	1,430,848	100.0
Streams.....	1,402,403	98.0
Lakes.....	6,157	0.4
Wells.....	1,877	0.1
Springs.....	10,879	1.4
Reservoirs.....	732	0.1

From the foregoing table it is apparent that up to the present time there has been little development of any source other than streams.

IRRIGATION WORKS.

The following table summarizes the data collected relating to works for supplying water for irrigation in 1910 and 1900. As only a few of the items reported in 1910 were reported in 1900, there is little opportunity for comparison of the two censuses.

IRRIGATION WORKS.	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Independent enterprises..... number..	3,092	1,834	1,258	68.6
Ditches, total length..... miles..	12,759	(1)		
Main ditches..... number..	3,209	1,834	1,375	75.0
Length..... miles..	7,662	24,977	2,685	53.9
Capacity..... cu. ft. per second..	80,458	(1)		
Lateral ditches..... number..	3,359	(1)		
Length..... miles..	5,097	(1)		
Reservoirs..... number..	243	(1)		
Capacity..... acre-feet..	1,742,303	(1)		
Flowing wells..... number..	62	(1)		
Capacity..... gals. per minute..	7,200	(1)		
Pumped wells..... number..	24	(1)		
Capacity..... gals. per minute..	2,826	(1)		
Pumping plants..... number..	58	(1)		
Engine capacity..... horsepower..	7,095	(1)		
Pump capacity..... gals. per minute..	278,569	(1)		

¹ Not reported. ² Error in 1899 figures. Correct total is 4,846.

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average number of acres irrigated per enterprise in 1909 was 463, and the acreage irrigated per mile of main ditch was 186.7, an increase of 64.4 from 1899, or 52.7 per cent.

There has been little development of underground water for irrigation up to this time. The table shows 62 flowing wells, which irrigate 1,172 acres, and 24 pumped wells, which irrigate 705 acres. The flowing wells are about evenly distributed among Ada, Canyon, Elmore, Oneida, and Owyhee Counties, but one-half of the pumped wells are in one county, Nez Perce.

Pumping for irrigation from either wells or streams has been but little practiced as yet. A single plant, that of the United States Reclamation Service in the Minidoka project, contributed 80 per cent of the total engine capacity reported, and about 84 per cent of the total pump capacity for the state. The total acreage irrigated with pumped water in 1909 was 20,925 acres.

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COST OF CONSTRUCTION, OPERATION, AND MAINTENANCE.

The table following shows the total cost of irrigation enterprises up to July 1, 1910, including construction of works and acquisition of rights, but not operation and maintenance, with the average cost per acre, based on the acreage the enterprises were capable of irrigating in 1910; the estimated final cost of enterprises completed and enterprises now under construction, with the average cost per acre, based on the acreage included in projects; and the total cost and the average cost per acre of operation and maintenance in 1909.

The cost of operation and maintenance is not reported for individual and partnership enterprises, for the reason that farmers generally clean their own ditches at odd times without keeping any record of the time spent. Under the larger enterprises this cost represents a cash outlay by the farmers, while under many of the smaller cooperative enterprises the cost is worked out by the farmers.

	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Cost of irrigation enterprises.....	\$40,977,671	\$5,116,227	\$35,861,444	700.9
Average per acre.....	\$17.15	\$3.70	\$13.36	352.5
Estimated final cost of existing enterprises.....	\$58,451,089	(³)	.....	.....
Average per acre included in projects.....	\$16.47	(³)	.....	.....
Operation and maintenance:				
Acreage for which cost is reported.....	4 883,698	(³)	.....	.....
Total cost reported.....	4 \$560,032	(³)	.....	.....
Average cost per acre.....	4 \$0.63	5 \$0.24	\$0.39	102.5

¹ Represents cost of construction of main canals and ditches in 1899.

² For acreage under ditch in 1899.

³ Not reported.

⁴ In 1909.

⁵ Report for 1899 does not indicate how obtained.

The cost of irrigation systems shows the largest increase of any item included in the census of irrigation,

700.9 per cent, and the average cost per acre shows the next largest increase, 352.5 per cent. The year 1899 was near the close of the era of private and cooperative construction, when most of the works were built by the water users themselves with little or no expenditure of money, and near the beginning of the present era of large-scale construction by corporations and the Federal Government. This later construction is not only on a larger scale but also more difficult as well as of a better type. Largely as a result of these influences the average cost per acre irrigated has greatly increased. A number of large enterprises are under construction. On these large expenditures have been made, while but little land is irrigated as yet. This condition tends to make the average cost shown higher than the true average. The average based on the estimated final cost and the acreage included in projects, \$16.47 per acre, probably more truly represents the average cost per acre of irrigation in Idaho. The county showing the lowest average cost per acre—\$4.29—is Fremont, which has the largest acreage irrigated. The highest average cost per acre is in Shoshone and Nez Perce Counties, which show \$92.83 and \$89.90 per acre, respectively. These counties have only small areas irrigated, devoted principally to fruit and gardens.

The acreage for which cost of operation and maintenance in 1909 is reported is 61.8 per cent of the total acreage reported as irrigated in 1909 and 86 per cent of the acreage reported as irrigated by other than individual and partnership enterprises. It can be said, therefore, to represent very fairly the average annual expense for all but individual and partnership enterprises.

CROPS.

As previously stated, the data relating to irrigated crops are taken from supplemental schedules filled out by the regular census enumerators. Since the special agents found enterprises which the enumerators had not reported, it is evident that the information relating to irrigated crops is incomplete to some extent. It shows, however, the relative importance of the different irrigated crops and is sufficiently complete to give reliable averages of yields.

The table following shows the acreage, yield, and value of the principal crops reported as grown under

irrigation, in comparison with totals for the same crops reported for the entire state. While small areas of other crops are grown both on irrigated and unirrigated land, the leading crops of the state, as well as the leading crops grown under irrigation, are represented in the table. In the reports of the agricultural census the acreages of seed crops are not generally given, but since the growing of these crops, especially alfalfa seed, is coming to be an important industry in the irrigated sections, the acreages are presented here.

CROP.	ACRES.			QUANTITY.			VALUE.	
	Total for state (number).	Irrigated.		Unit.	Amount.		Total for state.	Irrigated.
		Number.	Per cent of total.		Total for state.	Irrigated.		
Cereals:								
Corn.....	9,194	2,041	22.2	Bu.....	318,181	68,490	\$101,395	\$53,548
Oats.....	302,783	147,827	48.8	Bu.....	11,328,106	5,607,718	5,067,051	2,728,882
Wheat.....	399,234	106,923	26.8	Bu.....	10,237,009	2,860,976	8,412,587	2,377,367
Barley.....	300	17	5.7	Bu.....	5,575	800	3,827	463
Emmer and spelt.....	132,404	13,287	10.0	Bu.....	4,598,202	428,775	2,322,660	252,388
Rye.....	3,295	365	11.1	Bu.....	40,241	4,688	28,976	3,046
Other grains and seeds:								
Alfalfa seed.....	3,782	2,145	56.7	Bu.....	12,615	8,740	100,453	72,619
Clover seed.....	2,182	1,061	75.1	Bu.....	6,927	5,747	47,649	39,201
Timothy seed.....	1,504	215	14.3	Bu.....	9,955	1,387	21,723	3,135
Dry edible beans.....	1,915	208	15.6	Bu.....	33,816	2,083	76,314	8,074
Dry peas.....	284	68	29.1	Bu.....	4,876	1,850	9,160	3,992
Hay and forage:								
Timothy alone.....	102,610	24,842	24.2	Tons....	140,134	47,386	1,571,379	370,488
Timothy and clover mixed.....	53,092	33,418	61.9	Tons....	99,804	63,068	952,656	541,229
Clover alone.....	8,836	6,078	79.0	Tons....	20,944	18,697	152,189	130,069
Alfalfa.....	308,892	277,460	89.8	Tons....	904,529	903,191	6,621,460	6,237,550
Other tame or cultivated grasses ¹	39,786	18,803	47.3	Tons....	72,020	39,739	484,536	288,200
Wild, salt, or prairie grasses.....	120,361	89,320	71.7	Tons....	141,925	108,899	855,064	672,562
Grains cut green.....	97,211	7,395	7.6	Tons....	140,008	8,857	1,426,622	88,874
Coarse forage.....	804	754	84.3	Tons....	1,580	1,394	12,837	7,898
Sundry crops:								
Potatoes.....	28,341	10,794	69.8	Bu.....	4,710,262	3,561,374	1,583,447	1,165,621
Sugar beets.....	² 15,598	13,487	86.5	Tons....	² 179,038	153,203	² 813,460	693,884
Orchard fruits.....	³	4,489					² 868,437	340,181
Small fruits.....	² 1,673	1,043	62.3				² 201,525	125,601

¹ Includes millet or Hungarian grasses.

² Preliminary tabulation, subject to correction.

³ Agricultural reports give number of trees, not acreage.

Acreage.—Of the entire acreage of the crops for which totals are presented in the table, slightly less than one-half is irrigated. The proportion irrigated varies widely for the different crops.

The cereals are very generally grown without irrigation, the irrigated acreage being 31.9 per cent of the total acreage shown for these crops. Of the cereals, oats show the largest per cent irrigated, 48.8, while barley and rye each show only about 10 per cent. Wheat is about midway, with 26.8 per cent.

On the other hand, hay and forage crops are very generally irrigated, the irrigated area being 62.2 per cent of the total reported. Of these, only timothy and grains cut green show less than 45 per cent irrigated. Very little alfalfa is grown without irrigation, the irrigated area being 89.8 per cent of the total for this crop. Coarse forage ranks next with 84.3 per cent of its acreage irrigated, while clover alone and timothy and clover mixed show 79 and 61.9 per cent irrigated, respectively.

Of the miscellaneous crops shown in the table, sugar beets and potatoes are quite generally irrigated, the percentages of the acreages irrigated being 86.5 and 69.8, respectively.

Of the irrigated crops shown in the table, alfalfa has the largest acreage, having 36.1 per cent of the total acreage of irrigated crops. Oats follow with 19.2 per cent, wheat is next with 13.9 per cent, and wild grass is next with 11.2 per cent of the total. No other single crop shows as much as 5 per cent of the total acreage reported, the crops enumerated covering 80.4 per cent of the total acreage of irrigated crops reported.

While most of the crops irrigated are well distributed geographically, there is a tendency toward the

concentration of certain crops in particular localities. This is shown by the following statement, which gives the counties reporting the largest acreages of the principal irrigated crops, with their percentages of the total irrigated acreages of these crops in the state:

Corn.—Canyon County, 45.1 per cent; Twin Falls, 14.1 per cent; Lincoln, 10 per cent.

Oats.—Fremont County, 27.3 per cent; Twin Falls, 15.6 per cent; Bingham, 13.6 per cent.

Wheat.—Bingham County, 21.8 per cent; Fremont, 18.7 per cent; Twin Falls, 17.2 per cent.

Alfalfa.—Fremont County, 17.3 per cent; Bingham, 14.7 per cent; Canyon, 12 per cent.

Alfalfa seed.—Canyon County, 34.6 per cent; Lincoln, 33.3 per cent; Twin Falls, 18.1 per cent.

Clover.—Twin Falls County, 34.9 per cent; Bingham, 22.2 per cent; Canyon, 14.2 per cent.

Clover seed.—Bingham County, 41.8 per cent; Twin Falls, 41.5 per cent; Canyon, 12 per cent.

Timothy.—Fremont County, 21.8 per cent; Bannock, 13.9 per cent; Boise, 11.4 per cent.

Timothy and clover.—Lemhi County, 30.5 per cent; Fremont, 21.5 per cent; Ada, 8 per cent.

Wild grass.—Bear Lake County, 31.6 per cent; Bannock, 11 per cent; Blaine, 8.6 per cent.

Orchard fruits.—Bingham County, 21 per cent; Ada, 16 per cent; Fremont, 11.3 per cent.

Small fruits.—Canyon County, 24.1 per cent; Ada, 17.3 per cent; Fremont, 14.6 per cent.

Potatoes.—Bingham County, 41.8 per cent; Fremont, 11.6 per cent; Twin Falls, 10.3 per cent.

Sugar beets.—Fremont County, 56.6 per cent; Bingham, 29.4 per cent; Oneida, 9.7 per cent.

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Yield.—In the following table the average yields per acre of crops extensively grown, both with and without irrigation, are shown. The acreages and yields for unirrigated crops are obtained by subtracting the totals for irrigated crops from the totals for the state:

CROP.	AVERAGE YIELD PER ACRE.		
	Unirrigated.	Irrigated land.	
		Amount.	Per cent excess over yield on unirrigated land. ¹
Oats..... bushels..	36.5	38.3	5
Wheat..... bushels..	25.2	26.8	6
Barley..... bushels..	35.0	32.3	-8
Timothy alone..... tons..	1.19	1.91	61
Timothy and clover mixed..... tons..	1.79	1.89	6
Clover alone..... tons..	1.21	2.68	121
Alfalfa..... tons..	1.05	3.26	67
Wild, salt, or prairie grasses..... tons..	0.97	1.26	30
Potatoes..... bushels..	184.4	179.9	34

¹ A minus sign (—) indicates that yield on irrigated land is less than on unirrigated.

All the crops in the table except barley show greater average yields on irrigated land than on unirrigated land. In the case of the cereals the difference is only slight, but for the hay and forage crops, except "timothy and clover mixed," and for potatoes the average yields under irrigation in 1909 were considerably greater than those on unirrigated land.

In considering these comparisons it should be remembered that they are not comparisons of yields with and without irrigation in the same localities, but of yields under irrigation in localities where crops can not be grown without it, with yields in localities where irrigation is not necessary. They do not present, therefore, the relative advantages of farming with and without irrigation in a given community, but rather give one factor for determining the relative advantages of farming where irrigation is necessary and where it is not necessary for the successful growing of crops.

COUNTY TABLE.

The next table gives in detail, by counties, the data summarized above, except those relating to crops. For purposes of comparison the total number of farms in the state, the approximate land area of the state, the total land in farms, and the improved land in farms have been included in the table. Latah County reported no irrigation in 1909, and for that reason is not included in the table. As the state totals for the items just mentioned include Latah County, they to that extent exceed the sums of the corresponding figures for the counties represented in the table.

Several of the large enterprises extend into more than one county, and in some cases the reports from these enterprises do not segregate the data by counties. In such cases a distribution has been made according to the best estimates possible from all the information in possession of the bureau. It is believed that these estimates are approximately correct.

Change of boundaries.—In comparing the data secured in 1910 with those of 1900 the following changes in county boundaries should be considered: A part of Bingham County was annexed to Fremont County in 1905; Bonner County was organized from a part of Kootenai County in 1907; a part of Shoshone County was annexed to Nez Perce County in 1905; and Twin Falls County was organized from a part of Cassia County in 1907. Through a relocation of the boundary line between Idaho and Montana, 272,000 acres which were in Fremont and Lemhi Counties in 1900 are now in Montana. The changes in Bingham and Fremont Counties are so slight that comparisons with 1899 data have been made.

Error in 1899 figures.—The length of main ditches in Ada County in 1899 should have been reported as 170 miles instead of 301, making the state total 4,846. The percentage of increase for the county from 1899 to 1909 then becomes 25.3, and that for the state 58.1.

STATISTICS OF IRRIGATION—IDAHO.

AREA IRRIGATED, AND EXTENT AND COST OF IRRIGATION ENTERPRISES AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics.]

		THE STATE.	Ada.	Bannock.	Bear Lake.	Bingham. ¹	Blaine.	Boise.
1	Number of all farms in 1910.....	20,807	1,503	1,395	783	2,287	809	773
2	Number of farms irrigated in 1909.....	16,439	1,315	981	679	1,883	550	242
3	Per cent of all farms.....	53.4	87.5	70.3	86.7	82.3	63.3	31.3
4	Number of farms irrigated in 1899.....	9,138	694	708	686	1,039	439	309
5	Per cent of increase, 1899-1909.....	78.9	89.5	39.7	1.0	81.2	25.3	21.7
LAND AND FARM AREA								
6	Approximate land area.....							
7	Land in farms..... acres.....	2,453,346,560	727,040	2,034,560	602,880	2,634,240	3,916,800	2,220,160
8	Improved land in farms..... acres.....	2,283,004	136,067	2,074,403	167,276	305,704	210,255	170,282
9	Acres irrigated in 1909.....	2,773,740	89,365	169,758	107,652	191,239	94,250	103,011
10	Per cent of total land area.....	1,430,848	86,494	86,648	58,731	193,741	68,112	25,052
11	Per cent of land in farms.....	2.7	11.9	4.3	9.7	7.4	1.7	1.1
12	Per cent of improved land in farms.....	27.1	63.0	28.2	35.1	63.4	32.4	14.7
13	Acres irrigated in 1899.....	61.5	96.8	51.0	54.6	101.3	72.3	24.3
14	Per cent of increase, 1899-1909.....	608,718	48,038	49,679	43,650	71,189	38,188	17,918
15	Acres enterprises were capable of irrigating in 1910.....	135.4	80.1	74.3	34.5	172.4	111.6	69.8
16	Acres included in projects.....	2,388,959	87,511	112,288	59,829	310,903	87,089	32,359
		3,549,573	147,330	156,037	74,427	362,034	203,592	41,488
ACREAGE IRRIGATED								
CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17	U. S. Reclamation Service, irrigated in 1909.....	47,500						
18	Enterprises were capable of irrigating in 1910.....	113,000						
19	Included in projects.....	295,000	40,000					
20	U. S. Indian Service, irrigated in 1909.....	3,426		943		943		
21	Enterprises were capable of irrigating in 1910.....	21,540		10,000		10,000		
22	Included in projects.....	51,540		25,000		25,000		
23	Carey Act enterprises, irrigated in 1909.....	162,418					1,200	
24	Enterprises were capable of irrigating in 1910.....	742,618					5,000	
25	Included in projects.....	1,098,661					61,706	
26	Irrigation districts, irrigated in 1909.....	140,930	31,803				57,736	
27	Enterprises were capable of irrigating in 1910.....	177,900	32,100				75,030	
28	Included in projects.....	329,796	49,827		9,692		92,000	
29	Cooperative enterprises, irrigated in 1909.....	628,102	50,332	50,665	34,786		81,545	22,020
30	Enterprises were capable of irrigating in 1910.....	782,003	63,426	63,320	35,426	110,050	29,200	6,080
31	Included in projects.....	993,746	57,061	79,670	39,401	111,690	36,680	8,120
32	Commercial enterprises, irrigated in 1909.....	44,872	500	2,080			27,029	
33	Enterprises were capable of irrigating in 1910.....	67,352	500	3,310			34,029	
34	Included in projects.....	104,322	500	3,310			40,029	
35	Individual and partnership enterprises, irrigated in 1909.....	403,600	3,859	32,960	23,945		15,770	44,892
36	Enterprises were capable of irrigating in 1910.....	483,940	4,429	35,658	24,403		20,088	53,390
37	Included in projects.....	676,508	5,942	48,057	25,364		31,609	68,169
CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38	Supplied from streams.....	1,402,403	86,365	83,272	56,184	192,388	67,337	24,466
39	By gravity.....	1,383,718	80,315	83,272	56,184	192,388	67,337	24,466
40	By pumping.....	18,685	60					
41	Supplied from lakes.....	6,157	35		1,060			
42	By gravity.....	4,622	35		1,060			
43	By pumping.....	1,535						
44	Supplied from wells.....	1,877	89	1			70	6
45	Flowing.....	1,172	89	1			40	6
46	By pumping.....	705					30	
47	Supplied from springs.....	19,679	5	3,371	1,372	1,353	705	520
48	Supplied from reservoirs.....	732	4	115				60
49	Total acreage supplied from pumps.....	20,925	50				30	
IRRIGATION ENTERPRISES								
50	Independent enterprises..... number.....	3,092	40	261	112	116	254	180
51	Number in 1899.....	1,354	40	129	75	68	191	102
52	Per cent of increase, 1899-1910.....	68.6	15.0	102.3	49.3	70.6	33.0	76.5
53	Main ditches..... number.....	3,209	43	252	131	124	257	202
54	Number in 1899.....	1,354	40	129	75	68	191	102
55	Per cent of increase, 1899-1910.....	75.0	7.5	95.3	74.7	82.4	34.6	98.0
56	Length..... miles.....	7,662	213	631	394	591	620	251
57	Length in 1899.....	4,977	301	405	209	466	424	201
58	Per cent of increase, 1899-1910.....	53.9		55.8	88.5	26.8	40.2	24.9
59	Capacity..... cubic feet per second.....	80,458	4,267	4,036	2,192	10,353	4,363	933
60	Laterals..... number.....	3,359	121	137	37	205	256	76
61	Length..... miles.....	5,097	199	261	29	351	376	34
62	Reservoirs..... number.....	243	5	14	14	8	14	18
63	Capacity..... acre-feet.....	1,742,303	8,059	176,259	1,158	4,409	205,835	80
64	Flowing wells..... number.....	62	9	1			2	1
65	Capacity..... gallons per minute.....	7,200	370	30			75	42
66	Pumped wells..... number.....	24					1	
67	Capacity..... gallons per minute.....	2,826					600	
68	Pumping plants..... number.....	58	2				1	
69	Engine capacity..... horsepower.....	7,065	10				4	
70	Pump capacity..... gallons per minute.....	278,569	308				600	
COST								
71	Cost of enterprises up to July 1, 1910..... dollars.....	40,977,671	2,404,008	806,960	301,672	3,001,533	2,058,383	160,487
72	Cost in 1899.....	5,116,227	1,073,165	191,680	106,025	340,820	118,775	86,190
73	Per cent of increase, 1899-1910.....	700.9	124.0	321.0	184.5	219.0	1,033.0	88.4
74	Average cost per acre.....	17.15	27.47	7.19	5.04	9.65	23.47	4.96
75	Average cost per acre under ditch in 1899.....	8.79	4.29	2.74	2.62	4.18	2.24	5.41
76	Estimated final cost of existing enterprises.....	58,451,089	5,349,208	903,812	304,162	3,088,865	3,797,813	160,487
77	Average per acre included in projects.....	16.47	36.31	5.79	4.09	8.53	18.65	8.37
OPERATION AND MAINTENANCE								
78	Acres for which cost is reported.....	883,698	82,635	47,245	34,486	160,281	19,220	3,460
79	Total cost reported.....	560,032	40,753	14,294	6,391	60,949	9,820	1,709
80	Average per acre for which cost is reported.....	0.63	0.49	0.30	0.19	0.37	0.51	0.49
81	Average cost per acre in 1899.....	0.24						
82	Per cent of increase, 1899-1909.....	162.5						

¹ Change of boundary. (See explanation at close of text.)

² Includes Latah County. (See explanation at close of text.)

³ Decrease.

⁴ Includes 82,640 acres in Yellowstone National Park not shown separately.

⁵ Area irrigated includes wild grass, while improved area does not.

⁶ Error in 1899 figures. (See explanation at close of text.)

⁷ Not reported by counties in 1899.

STATISTICS OF IRRIGATION—IDAHO.

AREA IRRIGATED, AND EXTENT AND COST OF IRRIGATION ENTERPRISES AND

[Comparative data for 1899 in italics.]

	Bonner.	Canyon.	Cassia. ¹	Custer.	Elmore.	Fremont. ¹	Idaho.	Kootenai. ¹
1 Number of all farms in 1910	1,068	2,912	777	315	374	3,001	1,084	1,444
2 Number of farms irrigated in 1909	23	2,238	582	277	276	2,221	129	185
3 Per cent of all farms	2.2	76.9	74.9	87.9	73.8	71.9	7.7	12.8
4 <i>Number of farms irrigated in 1899</i>	(¹)	845	448	200	198	1,327	87	15
5 Per cent of increase, 1899-1909		164.9		38.5	100.0	67.4	48.3	
LAND AND FARM AREA								
6 Approximate land area	2,002,560	821,120	1,071,040	2,936,960	1,705,600	3,843,840	7,047,680	1,307,520
7 Land in farms	183,082	272,104	166,768	73,566	78,880	526,236	418,831	228,807
8 Improved land in farms	35,688	136,836	60,770	42,780	25,285	311,070	208,865	89,872
9 Acreage irrigated in 1909	887	133,046	59,510	41,889	17,781	303,168	3,872	2,984
10 Per cent of total land area	(⁸)	16.2	5.6	1.4	1.0	7.9	(⁹)	0.2
11 Per cent of land in farms	0.5	49.9	35.7	56.9	22.5	57.6	0.8	1.3
12 Per cent of improved land in farms	2.8	97.2	97.9	98.0	70.5	97.2	1.8	3.3
13 <i>Acreage irrigated in 1899</i>	(¹)	48,514	37,669	18,312	9,747	102,745	1,065	102
14 Per cent of increase, 1899-1909		174.2		128.8	82.4	195.1	216.6	
15 Acreage enterprises were capable of irrigating in 1910	837	182,685	94,244	54,505	27,403	409,767	3,900	10,128
16 Acreage included in projects	1,719	350,722	163,501	75,788	105,688	466,112	5,546	18,125
ACREAGE IRRIGATED								
CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17 U. S. Reclamation Service, irrigated in 1909		4,000	19,401					
18 Enterprises were capable of irrigating in 1910		12,000	45,046					
19 Included in projects		124,600	58,000					
20 U. S. Indian Service, irrigated in 1909								
21 Enterprises were capable of irrigating in 1910								
22 Included in projects								
23 Carey Act enterprises, irrigated in 1909		5,000			1,000	12,000		
24 Enterprises were capable of irrigating in 1910		20,000		3,500	8,000	20,212		
25 Included in projects		20,601	45,000	3,500	19,905	20,212		
26 Irrigation districts, irrigated in 1909		37,491				2,500		
27 Enterprises were capable of irrigating in 1910		47,070				10,500		
28 Included in projects		90,910				12,800		
29 Cooperative enterprises, irrigated in 1909		69,810	10,250	5,350	3,425	229,093		200
30 Enterprises were capable of irrigating in 1910		83,100	10,410	9,390	3,405	294,814		4,515
31 Included in projects		90,540	13,430	9,390	61,355	327,842		4,515
32 Commercial enterprises, irrigated in 1909						4,848		2,385
33 Enterprises were capable of irrigating in 1910						10,173		5,000
34 Included in projects				4,200		10,173		7,180
35 Individual and partnership enterprises, irrigated in 1909	837	10,745	29,859	30,539	13,356	64,122	3,372	899
36 Enterprises were capable of irrigating in 1910	837	10,515	38,788	41,015	16,938	74,058	3,900	611
37 Included in projects	1,719	29,981	47,131	58,098	24,428	95,285	5,546	6,400
CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38 Supplied from streams	836	132,708	57,815	41,479	16,868	301,532	3,328	304
39 By gravity	836	132,093	41,130	41,479	10,558	300,432	3,253	304
40 By pumping		45	16,685		310	1,100	75	
41 Supplied from lakes						200	12	2,670
42 By gravity						260	12	1,136
43 By pumping						260		1,535
44 Supplied from wells		129			633			8
45 Flowing		104			83			
46 By pumping		25			550			8
47 Supplied from springs	1	209	1,605	310	280	1,311	32	2
48 Supplied from reservoirs				100		60		
49 Total acreage supplied from pumps		70	16,685		860	1,100	75	1,543
IRRIGATION ENTERPRISES								
50 Independent enterprises	12	109	171	192	134	384	122	20
51 <i>Number in 1899</i>	(¹)	36	154	108	73	158	84	12
52 Per cent of increase, 1899-1910		202.8		77.8	83.6	152.6	45.2	16
53 Main ditches	18	103	176	215	134	410	126	17
54 <i>Number in 1899</i>	(¹)	36	154	108	73	158	84	12
55 Per cent of increase, 1899-1910		186.1		90.1	83.6	109.7	50.0	17
56 Length	10	533	286	549	266	1,071	116	33
57 <i>Length in 1899</i>	(¹)	267	348	259	129	557	90	10
58 Per cent of increase, 1899-1910		99.6		117.0	106.2	90.4	28.9	
59 Capacity	85	7,159	3,085	2,112	838	21,720	281	120
60 Laterals	11	247	354	160	119	291	29	28
61 Length	4	427	424	112	38	428	8	32
62 Reservoirs	7	13	7	13	22	32		3
63 Capacity	1	186,244	73,055	3,417	51,053	41,535		
64 Flowing wells	12				11			
65 Capacity	270				1,470			
66 Pumped wells	2				5			2
67 Capacity	60				690			180
68 Pumping plants	1		1		12	1	1	10
69 Engine capacity	17	5,400			9	200	25	970
70 Pump capacity	185	225,000			1,045	1,000	225	34,270
COST								
71 Cost of enterprises up to July 1, 1910	10,626	4,507,866	2,403,581	305,140	1,008,403	1,759,082	74,316	771,904
72 <i>Cost in 1899</i>	(¹)	745,845	79,370	56,895	189,445	530,132	20,800	8,135
73 Per cent of increase, 1899-1910		504.4		430.3	432.3	231.3	257.3	
74 Average cost per acre	12.70	24.69	25.50	5.00	36.80	4.29	18.63	76.23
75 <i>Average cost per acre under ditch in 1899</i>	(¹)	5.61	1.89	2.11	9.47	2.04	10.40	5.34
76 Estimated final cost of existing enterprises	10,626	8,855,666	4,074,824	308,340	1,508,403	1,791,082	74,316	771,904
77 Average per acre included in projects	6.18	24.83	24.91	4.07	14.27	3.84	13.40	42.59
OPERATION AND MAINTENANCE								
78 Acreage for which cost is reported		108,801	20,011	5,850	4,025	240,841		2,685
79 Total cost reported		106,013	24,080	3,605	28,600	63,140		16,059
80 Average per acre for which cost is reported		0.97	0.83	0.67	7.11	0.26		6.21
81 <i>Average cost per acre in 1899</i>								
82 Per cent of increase, 1899-1909								

¹Change of boundary. (See explanation at close of text.)

²Decrease.

STATISTICS OF IRRIGATION—IDAHO.

COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910—Continued.

[Comparative data for 1899 in italics.]

	Lemhi.	Lincoln.	Nez Perce. ¹	Oneida.	Owyhee.	Shoshone. ¹	Twin Falls.	Washing- ton.
1 Number of all farms in 1910	363	1,566	2,667	1,786	348	98	1,295	1,458
2 Number of farms irrigated in 1909	317	1,433	99	836	247	7	1,203	716
3 Per cent of all farms	87.3	91.5	3.7	46.8	71.0	7.1	92.9	49.1
4 <i>Number of farms irrigated in 1899</i>	<i>297</i>	<i>172</i>	<i>53</i>	<i>314</i>	<i>253</i>	<i>17</i>	<i>(1)</i>	<i>683</i>
5 Per cent of increase, 1899-1909	6.7	733.1		28.5	3.8			21.8
LAND AND FARM AREA								
6 Approximate land area.....acres.	3,114,880	2,101,120	2,460,160	1,699,200	5,048,320	1,650,560	1,208,320	1,837,440
7 Land in farms.....acres.	98,736	164,147	675,050	382,045	71,628	13,962	150,385	242,008
8 Improved land in farms.....acres.	47,811	86,016	300,340	200,936	28,350	3,500	110,562	110,159
9 Acreage irrigated in 1909	37,916	82,684	5,360	43,855	21,771	58	100,545	57,299
10 Per cent of total land area	1.2	3.9	0.2	2.6	0.4	(²)	8.3	3.1
11 Per cent of land in farms	38.4	50.4	0.9	11.5	30.4	0.4	66.9	23.7
12 Per cent of improved land in farms	79.3	96.1	1.7	21.8	76.8	1.7	90.9	52.0
13 <i>Acreage irrigated in 1899</i>	<i>24,517</i>	<i>10,104</i>	<i>1,100</i>	<i>43,155</i>	<i>16,669</i>	<i>70</i>	<i>(1)</i>	<i>32,477</i>
14 Per cent of increase, 1899-1909	54.7	718.3		1.7	31.4			76.4
15 Acreage enterprises were capable of irrigating in 1910	41,108	456,852	9,317	45,282	44,240	64	246,625	71,445
16 Acreage included in projects	61,677	514,955	29,896	93,023	162,111	188	384,590	124,964
ACREAGE IRRIGATED								
CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17 U. S. Reclamation Service, irrigated in 1909		24,099						
18 Enterprises were capable of irrigating in 1910		55,954						
19 Included in projects		72,400						
20 U. S. Indian Service, irrigated in 1909					1,540			
21 Enterprises were capable of irrigating in 1910					1,540			
22 Included in projects					1,540			
23 Carey Act enterprises, irrigated in 1909		36,500			1,000		95,000	
24 Enterprises were capable of irrigating in 1910		370,000			14,200		240,000	
25 Included in projects		403,120		10,394	40,310		375,080	
26 Irrigation districts, irrigated in 1909				3,000				8,400
27 Enterprises were capable of irrigating in 1910				3,000				9,300
28 Included in projects				33,395	38,002			9,400
29 Cooperative enterprises, irrigated in 1909	3,690	7,200		31,476	5,950			18,250
30 Enterprises were capable of irrigating in 1910	3,970	11,670		32,751	12,200			21,670
31 Included in projects	7,850	12,350		39,148	34,020			60,684
32 Commercial enterprises, irrigated in 1909			4,360					3,670
33 Enterprises were capable of irrigating in 1910			8,160					6,180
34 Included in projects			28,000					10,960
35 Individual and partnership enterprises, irrigated in 1909	34,226	14,885	1,000	9,379	13,281	58	5,545	26,979
36 Enterprises were capable of irrigating in 1910	37,138	19,228	1,157	9,531	16,300	64	6,625	34,295
37 Included in projects	53,827	27,085	1,896	10,086	48,239	188	9,610	43,920
CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38 Supplied from streams	37,224	76,468	5,198	40,983	21,407	44	99,025	57,172
39 By gravity	37,204	76,468	5,193	40,983	21,052	44	99,025	57,132
40 By pumping	20		5		355			40
41 Supplied from lakes		120		2,000				
42 By gravity		120		2,000				
43 By pumping								
44 Supplied from wells			86	62	93		670	
45 Flowing			1	85	93		670	
46 By pumping			85	7				
47 Supplied from springs	692	5,846	76	670	271	11	850	97
48 Supplied from reservoirs		250		110		3		30
49 Total acreage supplied from pumps	20		90	7	855			40
IRRIGATION ENTERPRISES								
50 Independent enterprises.....number	247	100	50	106	140	7	37	286
51 <i>Number in 1899</i>	<i>151</i>	<i>98</i>	<i>58</i>	<i>80</i>	<i>154</i>	<i>17</i>	<i>(1)</i>	<i>144</i>
52 Per cent of increase, 1899-1910	63.6	4.2		32.5	9.0			98.6
53 Main ditches.....number	272	105	49	104	137	3	32	299
54 <i>Number in 1899</i>	<i>151</i>	<i>96</i>	<i>8</i>	<i>80</i>	<i>154</i>	<i>17</i>	<i>(1)</i>	<i>144</i>
55 Per cent of increase, 1899-1910	80.1	9.4		30.0	2.2			107.6
56 Length.....miles	411	407	42	340	302	1	172	423
57 <i>Length in 1899</i>	<i>273</i>	<i>193</i>	<i>16</i>	<i>288</i>	<i>269</i>	<i>5</i>	<i>(1)</i>	<i>297</i>
58 Per cent of increase, 1899-1910	50.5	110.9		18.1	12.3			42.4
59 Capacity.....cubic feet per second	1,363	7,000	127	1,323	2,249	81	4,924	1,818
60 Laterals.....number	64	645	12	53	158		257	99
61 Length.....miles	32	1,293	33	102	66		792	36
62 Reservoirs.....number	1	8	11	25	14	1	2	12
63 Capacity.....acre-feet	1	379,024	30,033	26,006	50,779	1	492,000	13,354
64 Flowing wells.....number			3	9	9		5	
65 Capacity.....gallons per minute			400	1,487	80		2,970	
66 Pumped wells.....number			12	2				
67 Capacity.....gallons per minute			1,290	6				
68 Pumping plants.....number	1		14	2	5			4
69 Engine capacity.....horsepower	139		59	2	118			103
70 Pump capacity.....gallons per minute	5,400		1,410	6	4,615			4,605
COST								
71 Cost of enterprises up to July 1, 1910.....dollars.	199,731	10,265,589	837,586	1,585,759	1,274,833	5,941	6,653,172	581,099
72 <i>Cost in 1899</i>.....dollars.	<i>111,166</i>	<i>130,050</i>	<i>93,035</i>	<i>219,744</i>	<i>297,135</i>	<i>1,000</i>	<i>(1)</i>	<i>183,321</i>
73 Per cent of increase, 1899-1910	79.7	7,793.6		621.6	329.0			369.3
74 Average cost per acre.....dollars.	4.86	22.47	89.90	35.02	28.82	92.83	26.98	8.13
75 <i>Average cost per acre under ditch in 1899</i>	<i>3.97</i>	<i>4.82</i>	<i>7.16</i>	<i>4.00</i>	<i>10.61</i>	<i>10.00</i>	<i>(1)</i>	<i>2.58</i>
76 Estimated final cost of existing enterprises.....dollars.	203,216	11,770,546	1,614,586	1,817,103	4,034,943	5,941	7,415,142	584,084
77 Average per acre included in projects.....dollars.	3.29	22.87	54.01	19.53	24.89	31.60	19.28	4.67
OPERATION AND MAINTENANCE								
78 Acreage for which cost is reported	570	66,299	4,300	34,204	6,950			27,435
79 Total cost reported.....dollars.	50	100,251	3,000	49,817	20,008			11,487
80 Average per acre for which cost is reported.....dollars.	0.09	1.51	0.70	1.46	2.88			0.42
81 <i>Average cost per acre in 1899</i>								
82 Per cent of increase, 1899-1909								

¹ Less than one-tenth of 1 per cent.

¹ Not reported by counties in 1899.

IRRIGATION : MONTANA

FARMS AND ACREAGE IRRIGATED, IRRIGATION WORKS, COST OF CONSTRUCTION, COST OF OPERATION AND MAINTENANCE,
AND CROPS IRRIGATED

Prepared under the supervision of LE GRAND POWERS, Chief Statistician for Agriculture, by R. P. TEELE, Special Agent in Charge of Irrigation

INTRODUCTION.

This bulletin presents the larger part of the statistics of irrigation for Montana obtained in connection with the Thirteenth Census. These data, with additional information, will be embodied in a special report of the Census of Irrigation and in the final reports of the Thirteenth Census. The statistics of the number of farms and acreage irrigated, cost of operation and maintenance, and irrigated crops are for the calendar year 1909; those of irrigation works, cost of enterprises, acreage enterprises were capable of irrigating in 1910, and acreage included in projects are of the date July 1, 1910.

These statistics have been collected under the law of February 25, 1910, which contained the following clause relating to irrigation:

Inquiries shall also be made as to the location and character of irrigation enterprises, quantity of land irrigated in the arid region of the United States and in each state and county in that section under state and Federal laws; the price at which these lands, including water rights, are obtainable; the character and value of crops produced on irrigated lands, the amount of water used per acre for said irrigation and whether it was obtainable from national, state, or private works; the location of the various projects and methods of construction, with facts as to their physical condition; the amount of capital invested in such irrigation works.

The information called for by this law which could be supplied by farm operators was obtained on supplemental schedules by the regular census enumerators as a part of the agricultural census. The remaining data, which were supplied by the owners or officials of irrigation enterprises, were obtained on special schedules by special agents. The data relating to number of farms irrigated and irrigated crops are taken from the supplemental schedules, while all data relating to acreage irrigated and to irrigation works and their construction and operation are taken from the special schedules.

In accordance with the law, the data collected have been classified primarily by the state and Federal laws by virtue of which the land was brought under irrigation. The results are presented in detail at the end of this bulletin and summarized in text tables.

Such of the terms used as are not self-explanatory are defined below.

Farms irrigated.—The number of "farms irrigated" is the number of farms on which irrigation is practiced and is equivalent to the term "number of irrigators" used in previous census reports.

Types of enterprise.—The types of enterprise under which the lands irrigated in 1909 are classified are as follows:

United States Reclamation Service enterprises, which operate under the Federal law of June 17, 1902, providing for the construction of irrigation works with the receipts from the sale of public lands.

United States Indian Service enterprises, which operate under various acts of Congress providing for the construction by that service of works for the irrigation of land in Indian reservations.

Carey Act enterprises, which operate under the Federal law of August 18, 1894, granting to each of the states in the arid region 1,000,000 acres of land on condition that the state provide for its irrigation, and under amendments to that law granting additional areas to Idaho and Wyoming.

Irrigation districts, which are public corporations that operate under state laws providing for their organization and management, and empowering them to issue bonds and levy and collect taxes with the object of obtaining funds for the purchase or construction, and for the operation and maintenance of irrigation works.

Cooperative enterprises, which are controlled by the water users under some organized form of cooperation. The most common form of organization is the stock company, the stock of which is owned by the water users.

Commercial enterprises, which supply water for compensation to parties who own no interest in the works. Persons obtaining water from such enterprises are usually required to pay for the right to receive water, and to pay, in addition, annual charges based in some instances on the acreage irrigated and in others on the quantity of water received.

Individual and partnership enterprises, which belong to individual farmers or to neighboring farmers, who control them without formal organization. It is not always possible to distinguish between partnership and cooperative enterprises, but as the difference is slight this is unimportant.

Source of water supply.—Of the terms used in the classification according to source of water supply, none requires explanation except "reservoirs." The only reservoirs which are treated as independent sources of supply are those filled by collecting storm water or from watercourses that are ordinarily dry. When reservoirs are filled from streams or wells, the primary source is considered the source of supply.

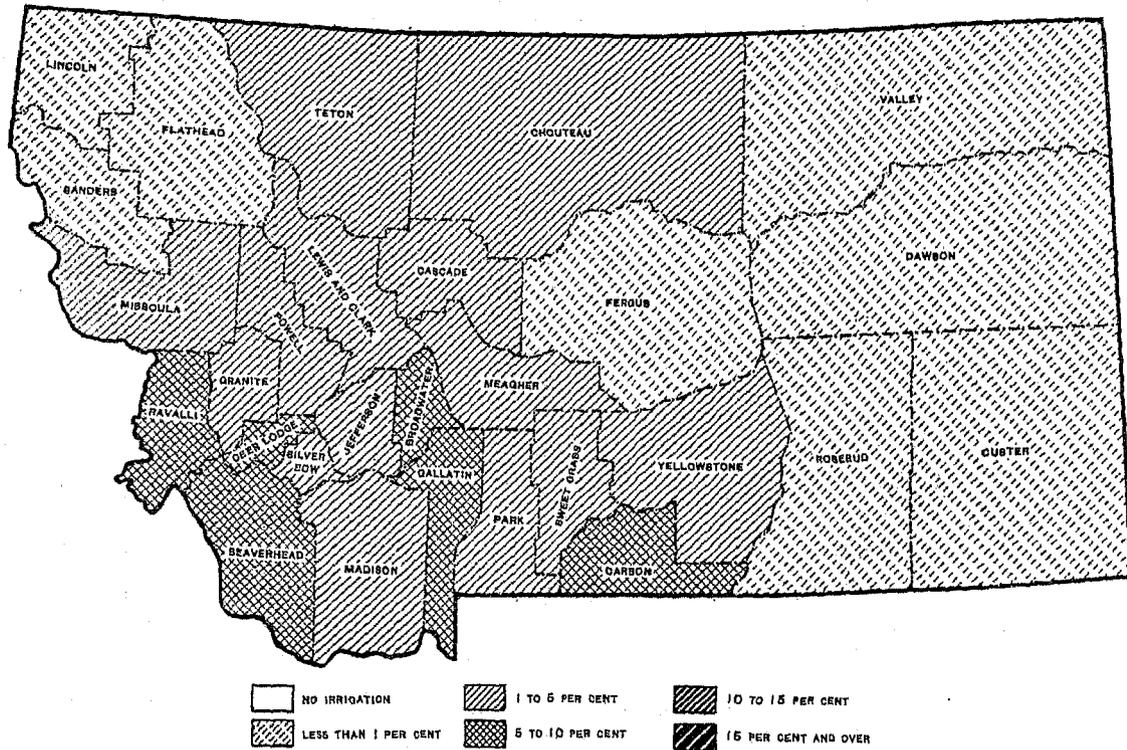
Acre-foot.—The "acre-foot," used to express the capacity of reservoirs, is the volume of water required to cover 1 acre to a depth of 1 foot, or 43,560 cubic feet.

Cost.—The cost of irrigation enterprises is that given by the owners. For the larger works the cost given is taken, in most cases, from the books of account and represents the actual cost. In the case of most of the private and partnership and many of the cooperative enterprises, however, the works were built by their owners without records of money or labor expended, and the cost given represents the owners' estimates. The cost reported for 1910 includes the cost of construction and of acquiring rights. The latter usually consists of filing fees only. In some instances it includes the purchase price of rights, but these cases are so rare that they are unimportant. The cost reported for 1899 is designated "cost of construction," but probably includes the cost of acquiring rights, as in 1910. The average cost per acre is based on the acreage enterprises were capable of irrigating in 1910 and the cost to July 1, 1910.

PER CENT OF TOTAL LAND AREA IRRIGATED, AND PER CENT OF NUMBER OF FARMS IRRIGATED,
IN MONTANA, BY COUNTIES: 1909.

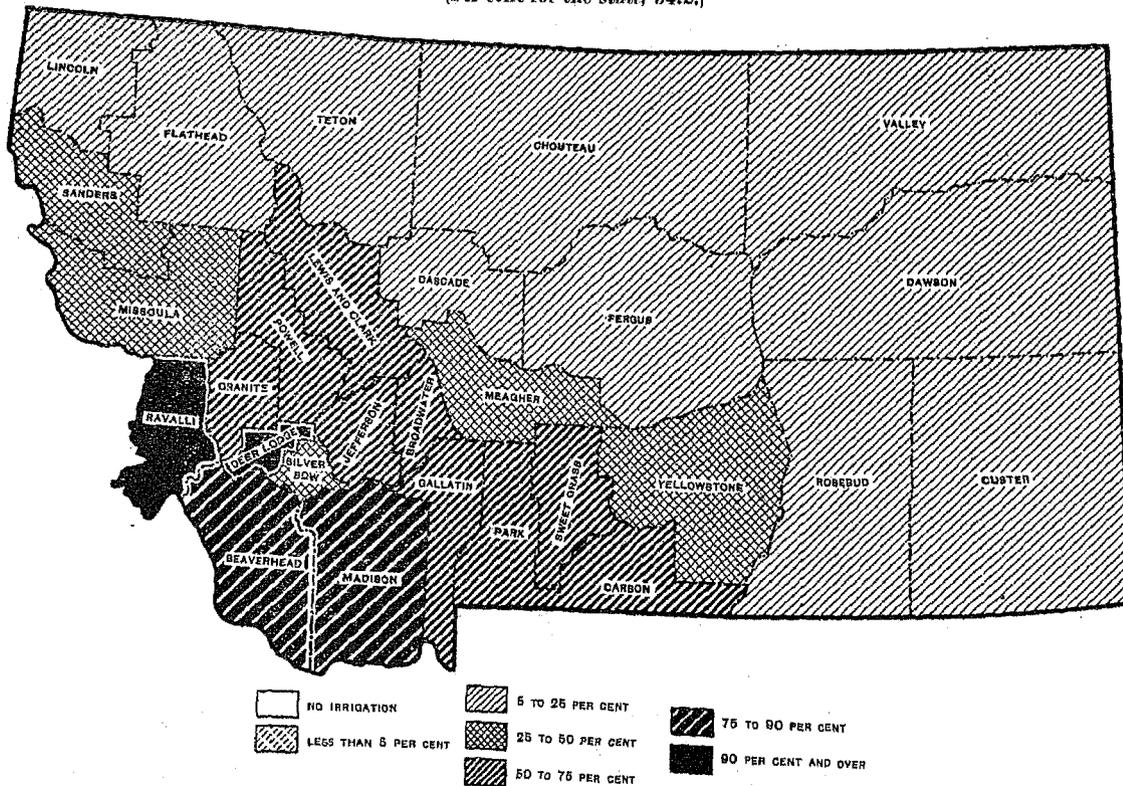
PER CENT OF TOTAL LAND AREA IRRIGATED.

[Per cent for the state, 1.8.]



PER CENT OF NUMBER OF FARMS IRRIGATED.

[Per cent for the state, 34.2.]



FARMS AND ACREAGE IRRIGATED.

Topographically Montana is divided into two approximately equal parts, of which the western lies in the Rocky Mountains and the eastern in the Great Plains. Throughout the state the rainfall is sufficient in most seasons for the maturing of grain crops without irrigation, the normal annual precipitation ranging from about 15 inches at the eastern boundary to about 20 inches at the western boundary, and a still higher figure in the northwest corner.

Irrigation is practiced throughout the state, but about 75 per cent of the acreage reported irrigated in 1909 lies in the valleys of the western or mountainous section. The eastern division is devoted principally to grazing and dry farming. The location of the irrigated lands of the state is indicated in a general way by the maps on the opposite page, which show the class in which each county falls with reference to the percentage which the irrigated land is of the total land area and the percentage which irrigated farms are of all farms.

The following table shows for the state as a whole the number of farms and acreage irrigated, in comparison with the total number of farms, the total land area, the total land in farms, the total acreage of improved land in farms, and the areas not yet irrigated for which water has been or is being made available. Comparative data for the census of 1900 are included as far as possible. In the irrigation report for 1900 the figures for farms and acreage irrigated in Montana did not include statistics for Indian reservations, and therefore a discrepancy is involved in comparisons of these items with the totals for farms and acreage in 1900, as shown in this table and in comparisons with the statistics for farms and acreage irrigated in 1909. Since, however, irrigated farms and land on reservations formed only small proportions of the totals for the state in 1909, comparisons are but little affected by the omission in the Twelfth Census report.

	CENSUS OF—		INCREASE, ¹	
	1910	1900	Amount.	Per cent.
Number of all farms.....	² 26, 214	³ 13, 370	12, 844	96. 1
Approximate land area of the state..... acres.....	93, 568, 640	93, 296, 640	272, 000	0. 3
Land in farms..... acres.....	² 13, 545, 603	³ 11, 844, 454	1, 701, 149	14. 4
Improved land in farms..... acres.....	² 3, 640, 309	³ 1, 736, 701	1, 903, 608	109. 6
Number of farms irrigated.....	⁴ 8, 970	⁵ 8, 043	927	11. 5
Acreage irrigated.....	⁴ 1, 679, 084	⁵ 951, 154	727, 930	76. 5
Acreage enterprises were capable of irrigating.....	⁶ 2, 205, 155	(⁷)		
Acreage included in projects.....	⁸ 3, 515, 602	(⁷)		
Percentage irrigated of—				
Number of all farms.....	34. 2	60. 2	-26. 0	
Approximate land area of the state.....	1. 8	1. 0	0. 6	
Land in farms.....	12. 4	8. 0	4. 4	
Improved land in farms.....	46. 1	54. 8	-8. 7	
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909.....	526, 071			
Excess of acreage included in projects over acreage irrigated in 1909.....	1, 836, 518			

¹ A minus sign (-) denotes decrease.
² April 15.

³ June 1.
⁴ In 1909.

⁵ In 1899, exclusive of Indian reservations.
⁶ In 1910.

⁷ Not reported.
⁸ Reported July 1, 1910.

Number of farms irrigated.—The number of farms irrigated is made up of the number reported on the supplemental schedules by the regular enumerators, together with an estimate of the number of farms covered by enterprises which were reported by special agents but not by the regular enumerators. This estimate was based upon the average acreage irrigated per farm shown by the supplemental schedules. The fact that six counties, of which three suffered a loss of territory between the last two censuses, show considerable decreases in the number of farms irrigated accompanied by increases in the acreage irrigated, suggests that the figures for 1909 and 1899 are not wholly comparable.

According to the figures presented in the table, irrigation was practiced on slightly more than one-

third (34.2 per cent) of the farms in the state in 1909. In 1899 the proportion of irrigated farms was much higher (60.2 per cent), while in 1889 it was still higher (66.1 per cent). In both decades the number of unirrigated farms increased at a higher rate than the number of irrigated farms, but this development of farming without irrigation was much more rapid in the later decade.

Of the 28 counties of the state, 13 report more than half their farms irrigated, 3 between 40 and 50 per cent, 1 between 30 and 40 per cent, 1 between 20 and 30 per cent, 5 between 10 and 20 per cent, and 5 less than 10 per cent. The counties having more than 50 per cent of their farms irrigated are in the southwestern part of the state, while those having low percentages form a large group covering

STATISTICS OF IRRIGATION—MONTANA.

the eastern, northern, and central parts. Deer Lodge County shows the largest percentage, 99.4, and Ravalli the next largest, 92.4 per cent.

From 1899 to 1909 the increase in the number of farms irrigated was 11.5 per cent for the entire state. Of the 16 counties which did not change in area during that period, 11 show increases, varying greatly in degree, while 5 show decreases. Of the latter group of counties Cascade, Chouteau, and Fergus are in the "dry-farm" section, and Lewis and Clark County shows a decrease in the number of unirrigated farms as well as a decrease in the number of irrigated farms.

Acreage irrigated.—The acreage irrigated is taken from the special schedules filled out by agents from information obtained from owners or officials of irrigation enterprises and, in some instances, from public records. The acreage thus obtained is considerably larger than the irrigated acreage reported on the supplemental schedules filled out by the farm enumerators. This difference is due in a measure to the fact that the special agents found enterprises which were not reported on any schedules returned by the enumerators, indicating that the acreage reported on the supplemental schedules is short to some extent. On the other hand, there is a natural tendency for the officials of irrigation enterprises to report as irrigated the entire area of farms of which only a part is irrigated. In some sections, furthermore, farms are so situated as to receive water from more than one ditch, and may be reported as irrigated by each, which causes duplication. It has been impossible to eliminate this duplication or to determine its extent. Owing to the causes last enumerated, it is probable that the acreage reported irrigated is excessive, but the extent of this excess can not be determined. It is believed, however, that this does not exceed 10 per cent for the state of Montana.

The total acreage reported as irrigated in 1909 was 1,679,084 acres, against 951,154 acres in 1899 and 350,582 acres in 1889. The percentage of increase from 1889 to 1899 was 171.3, while from 1899 to 1909 it was 76.5. The absolute increase during the latter decade was the larger, however—727,930 acres, against 600,572 acres between 1889 and 1899.

In the acreage irrigated the percentage of increase between 1899 and 1909 was considerably higher than in the number of farms irrigated, the acreage irrigated per farm increasing from 118 in 1899 to 187 in 1909. During the same period the average size of farms in the state decreased from 886 to 517 acres, which change, considered in connection with the increase in the acreage irrigated per farm, indicates that farmers are irrigating larger parts of their holdings than formerly.

The percentage of the total land area of the state irrigated increased from 1 in 1899 to 1.8 in 1909, while the percentage of all land in farms which was under irrigation increased from 8 in 1899 to 12.4 in 1909. As a result of the rapid development of dry farming in recent years, however, there was a decrease in the percentage of the total improved land in farms which was under irrigation from 54.8 in 1899 to 46.1 in 1909.

In both 1909 and 1899 the county for which the largest acreage of irrigated land was reported was Beaverhead, the areas being 221,716 acres and 138,022 acres, respectively. Five other counties each report over 100,000 acres irrigated in 1909, while three more report over 90,000 acres irrigated in that year.

The counties in which irrigated land forms the highest percentage of the total land area are Gallatin and Carbon, the proportion in the former being 7.9 per cent and that in the latter 7.8 per cent.

Acreage included in projects.—The foregoing table shows that in 1910 existing enterprises were ready to supply water to 2,205,155 acres, or 526,071 acres more than were irrigated in 1909. It is probable that, after allowance is made for an increase in the area irrigated in 1910 over that in 1909, there remained at the close of 1910 under ditch but not irrigated considerably more than half as much land as was brought under irrigation in the 10 years from 1899 to 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 1,836,518 acres, which is more than twice the acreage brought under irrigation in the last decade and somewhat more than the total area irrigated in 1909. This acreage represents the area which will be available for the extension of irrigation in the next few years upon the completion of existing enterprises and without new undertakings. It indicates in a general way the area available for settlement, although much of this unirrigated land is in farms already settled.

Acreage irrigated, classified by character of enterprise.—The following table gives the distribution of the acreage irrigated in 1909 according to the character of the enterprise controlling the irrigation works:

CHARACTER OF ENTERPRISE.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All classes.....	1,679,084	100.0
U. S. Reclamation Service.....	14,077	0.8
U. S. Indian Service.....	67,417	4.0
Carey Act enterprises.....	9,648	0.6
Irrigation districts.....	412	(1)
Cooperative enterprises.....	333,926	19.9
Commercial enterprises.....	62,544	3.7
Individual and partnership enterprises.....	1,191,060	70.9

¹ Less than one-tenth of 1 per cent.

Irrigation districts, cooperative enterprises, and individual and partnership enterprises are all controlled by the water users. These supply about 91 per cent of the acreage irrigated. United States Reclamation Service and Carey Act enterprises, which are to be turned over to the water users, supply about 1 per cent of the acreage irrigated. Thus only about 8 per cent of the irrigated land is supplied by enterprises which are not either controlled by the water users or to be turned over to them ultimately.

Acreage irrigated, classified by source of water supply.—The table following shows the distribution of the acreage irrigated in 1909 according to the source of water supply.

From this table it is apparent that up to the present time there has been little development of any source

other than streams. Irrigation from reservoirs is practiced principally in the counties of the plains, where for large parts of the land a water supply from streams is not available, and the storage of storm waters offers the only means of irrigation.

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources.....	1,679,084	100.0
Streams.....	1,632,619	97.2
Lakes.....	5,622	0.3
Wells.....	262	(¹)
Springs.....	17,967	1.1
Reservoirs.....	22,614	1.3

¹ Less than one-tenth of 1 per cent.

IRRIGATION WORKS.

The table following summarizes the data collected relating to works for supplying water for irrigation in 1910 and 1900. Since only a few of the items reported in 1910 were reported in 1900, there is little opportunity for comparisons between the two censuses. As was noted in the discussion of farms and acreage irrigated, the census of 1900 made no report as to irrigation on Indian reservations in Montana; but the percentages of increase for the items given are not materially affected by the difference between the two censuses in this respect.

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average number of acres irrigated per enterprise was 303.4 and the acreage irrigated per mile of main ditch was 129.3, a decrease of 10.3 acres compared with 1899, or 7.4 per cent.

There has been as yet but little utilization of underground water. The table shows but 15 flowing wells and 10 wells pumped for irrigation, which watered only 262 acres altogether in 1909. The flowing wells are in

Carbon, Custer, Missoula, and Teton Counties, and the pumped wells in Broadwater, Dawson, Gallatin, Lincoln, Rosebud, and Sanders Counties.

The water pumped for irrigation is for the most part taken from streams. The plants are located principally in the plains, 106 of the 125 plants reported being in the counties of that section.

IRRIGATION WORKS.	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Independent enterprises.....number..	5,534	2,902	2,632	90.7
Ditches, total length.....miles..	18,934	(¹)	.....	.....
Main ditches.....number..	6,673	2,902	3,771	129.9
Length.....miles..	12,990	6,812	6,178	90.7
Capacity.....cu. ft. per second..	83,849	(¹)	.....	.....
Lateral ditches.....number..	8,307	(¹)	.....	.....
Length.....miles..	5,944	(¹)	.....	.....
Reservoirs.....number..	827	(¹)	.....	.....
Capacity.....acre-feet..	530,261	(¹)	.....	.....
Flowing wells.....number..	15	(¹)	.....	.....
Capacity.....gals. per minute..	22,185	(¹)	.....	.....
Pumped wells.....number..	10	(¹)	.....	.....
Capacity.....gals. per minute..	5,263	(¹)	.....	.....
Pumping plants.....number..	125	(¹)	.....	.....
Engine capacity.....horsepower..	3,511	(¹)	.....	.....
Pump capacity.....gals. per minute..	281,190	(¹)	.....	.....

¹ Not reported.

COST OF CONSTRUCTION, OPERATION, AND MAINTENANCE.

The table following shows the total cost of irrigation enterprises up to July 1, 1910, including construction of works and acquisition of rights, but not operation and maintenance, with the average cost per acre, based on the acreage the enterprises were capable of irrigating in 1910; the estimated final cost of enterprises completed and enterprises now under construction, with the average cost per acre, based on the acreage included in projects; and the total cost and average cost per acre of operation and maintenance in 1909. Similar data from the census of 1900, so far as available, are included for comparison.

The cost of operation and maintenance is not reported for individual and partnership enterprises, for the reason that farmers whose land is irrigated by such systems generally clean their own ditches at odd times without keeping any record of the time spent. In the case of larger enterprises this cost represents a

cash outlay by the farmers, while in the case of many of the smaller cooperative enterprises the cost is worked out by the farmers.

	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Cost of irrigation enterprises.....	¹ \$22,970,958	² \$4,683,073	\$18,287,885	390.5
Average per acre.....	³ \$10.42	⁴ \$4.92	\$5.50	111.8
Estimated final cost of existing enterprises.....	\$32,407,452	(⁵)	.....	.....
Average per acre included in projects.....	\$9.22	(⁵)	.....	.....
Operation and maintenance:				
Acreage for which cost is reported.....	394,507	(⁵)	.....	.....
Total cost reported.....	\$349,662	(⁵)	.....	.....
Average cost per acre.....	\$0.89	\$0.28	\$0.61	217.9

¹ Reported July 1, 1910.

² Cost of systems operated in 1899.

³ Based on acreage enterprises were capable of irrigating in 1910.

⁴ Based on acreage irrigated in 1899.

⁵ Not reported.

STATISTICS OF IRRIGATION—MONTANA.

As previously stated, the census of 1900 made no report as to irrigation on Indian reservations; but the average costs for that year and the percentages of increase in cost for the 10 years following are not materially affected by this shortage.

The cost of irrigation systems shows the largest increase of any item included in the census of irrigation, 390.5 per cent. In the average cost per acre there was an increase of 111.8 per cent. However, the average cost per acre shown for the census of 1900 is based on the acreage irrigated in 1899 instead of the acreage under ditch, as in 1910, the latter acreage not being reported in 1900. If computed on the basis of the acreage irrigated in 1909, the average cost in 1910 would be \$13.68, representing an increase of 178 per cent over the figure for the average cost at the census of 1900. The year 1899 was near the close of the period of private and cooperative construction, when most of the works were built by the water users themselves with little or no expenditure of money, and near the beginning of the present period of large-scale construction by corporations and the Federal Government. This later construction is not only on a larger scale, but also more difficult and of a better type. Largely as a result of these influences the average cost per acre of irrigation has greatly increased. A num-

ber of large enterprises are under construction, and on these large expenditures have been made, while but little land is irrigated as yet. This condition tends to make the average cost shown higher than the true average. The average based on the estimated final cost and the acreage included in projects, \$9.22 per acre, probably more truly represents the average cost per acre of irrigation in Montana.

The county showing the lowest average cost per acre enterprises were capable of irrigating in 1910, \$2.70, is Granite. The highest average cost per acre, \$60.33, is in Dawson County, where the unusual cost is due to the large expenditures made on works which were nearly complete July 1, 1910, but on that date were ready to supply water to only a part of the land to be irrigated ultimately. The estimated final cost per acre included in projects for Dawson County, \$43.24, is likewise the highest reported for the counties of the state.

The acreage for which cost of operation and maintenance in 1909 is reported is 23.5 per cent of the total acreage reported as irrigated in 1909, and 80.8 per cent of the acreage reported as irrigated by other than individual and partnership enterprises. It can be said, therefore, to represent fairly the average annual expense for all but individual and partnership enterprises.

CROPS.

As previously stated, the data relating to irrigated crops are taken from supplemental schedules filled out by the regular census enumerators. Since the special agents found enterprises which the enumerators had not reported, it is evident that the information relating to irrigated crops is incomplete to some extent.

It shows, however, the relative importance of the different irrigated crops, and is sufficiently complete to give reliable averages of yields.

The following table shows the acreage, yield, and value of the principal crops reported as grown under irrigation, in comparison with totals for the same crops reported for the entire state:

CROP.	ACRES.			QUANTITY.			VALUE.	
	Total for state (number).	Irrigated.		Unit.	Amount.		Total for state.	For irrigated land.
		Number.	Per cent of total.		Total for state.	On irrigated land.		
Cereals:								
Corn.....	9,514	1,640	17.2	Bushels.....	274,103	51,488	\$185,367	\$38,613
Oats.....	333,195	159,658	47.9	Bushels.....	13,805,735	6,905,254	6,148,021	3,273,203
Wheat.....	258,377	45,568	17.6	Bushels.....	6,251,945	1,236,137	5,329,389	1,064,794
Emmer and spelt.....	1,308	141	10.8	Bushels.....	39,830	4,609	24,043	3,057
Barley.....	27,242	9,271	34.0	Bushels.....	753,268	273,827	478,811	189,952
Rye.....	6,034	867	14.4	Bushels.....	111,214	15,438	82,060	10,985
Other grains and seeds:								
Alfalfa seed.....	3,695	1,527	41.3	Bushels.....	10,379	4,817	88,375	36,007
Dry peas.....	1,184	951	80.3	Bushels.....	21,670	19,966	37,767	31,824
Hay and forage:								
Timothy alone.....	117,888	48,868	41.5	Tons.....	171,030	76,230	1,594,398	736,041
Timothy and clover mixed.....	90,841	60,437	66.8	Tons.....	166,039	102,060	1,457,117	952,118
Clover alone.....	11,575	8,433	72.9	Tons.....	24,094	17,350	176,507	126,659
Alfalfa.....	224,226	183,264	81.7	Tons.....	599,747	514,803	3,793,059	3,188,918
Other tame or cultivated grasses ¹	59,121	22,195	37.5	Tons.....	78,657	37,424	578,719	318,494
Wild, salt, or prairie grasses.....	584,732	329,579	56.4	Tons.....	589,860	339,821	4,131,324	2,392,486
Grains cut green.....	45,892	5,988	13.0	Tons.....	70,336	10,418	692,351	81,597
Coarse forage.....	1,138	119	10.5	Tons.....	1,719	738	14,102	5,026
Sundry crops:								
Potatoes.....	20,710	11,137	53.8	Bushels.....	3,240,696	1,938,677	1,298,830	755,968
Sugar beets.....	28,710	7,551	26.7	Tons.....	108,782	91,509	543,508	461,208
Orchard fruits.....	(²)	8,029					607,172	466,033
Small fruits.....	563	264	46.9				286,580	39,474

¹ Includes millet or Hungarian grass.

² Preliminary tabulation, subject to correction.

³ Agricultural report gives number of trees and not acres.

While small quantities of other crops are grown both on irrigated and unirrigated land, the leading crops of the state, as well as the leading crops grown under irrigation, are represented in the table. In the reports of the agricultural census the acreages of seed crops are not usually given, but since the growing of these crops, especially alfalfa seed, is coming to be an important industry in the irrigated sections of the country, the total acreages and the acreages grown under irrigation are presented in the preceding table.

Acreage.—Of the entire acreage of the crops for which totals are presented in the table, slightly more than one-half is irrigated, but the proportion irrigated varies widely for the different crops.

The cereals are very generally grown without irrigation, the irrigated acreage given in the table being 34.2 per cent of the total acreage shown for these crops. The highest percentage of acreage irrigated shown for any cereal, 47.9, is reported for oats, and the next highest, 34, for barley. The proportions for wheat and corn are, respectively, 17.6 and 17.2 per cent.

The hay and forage crops are more generally irrigated than the cereals, the irrigated acreage being 58 per cent of the total reported for these crops. In the case of four of the eight hay and forage crops included in the table, more than half of the total acreage is irrigated. The irrigated alfalfa acreage forms 81.7 per cent of the entire acreage in that crop, and the irrigated acreage devoted to clover alone forms 72.9 per cent of the total land in clover. For timothy and clover mixed and for wild, salt, or prairie grasses the corresponding percentages are 66.8 and 56.4, respectively.

Of the entire acreage in potatoes, 53.8 per cent is irrigated, and of that in small fruits, 46.9 per cent. The sugar-beet area in Montana is for the most part irrigated, the percentage being 86.7. The relative importance of the irrigated orchard acreage can not be determined, because the total acreage of orchards in the state is not reported, but it will be observed that more than three-fourths of the value of all orchard fruits produced in the state is that of products grown on irrigated land.

Of the crops shown in the table, "wild, salt, or prairie grasses" have the largest irrigated acreage, representing 36.4 per cent of the total irrigated acreage of the crops given. Alfalfa is next with 20.2 per cent of this total, and is followed by oats, with 17.6 per cent, and timothy and clover mixed, with 6.7 per cent. No other single crop covers as much as 6 per cent of the total acreage of irrigated crops presented in the table.

While most of the crops irrigated are well distributed geographically, there is a tendency toward the concentration of certain crops in particular localities. This is shown by the statement following, which gives the counties having the largest acreages of the principal irrigated crops, with the proportions which they contain of the total irrigated acreages of these crops in the state.

Corn.—Yellowstone County, 34.7 per cent; Rosebud, 20.7 per cent; Custer, 16.8 per cent.

Oats.—Gallatin County, 19 per cent; Carbon, 9.8 per cent; Beaverhead, 9.6 per cent.

Wheat.—Carbon County, 16.2 per cent; Gallatin, 14.9 per cent; Yellowstone, 13.6 per cent.

Barley.—Gallatin County, 31.7 per cent; Carbon, 13.3 per cent; Park, 7.4 per cent.

Alfalfa seed.—Rosebud County, 28.7 per cent; Carbon, 25.9 per cent; Chouteau, 24.9 per cent.

Timothy alone.—Park County, 10.3 per cent; Gallatin, 10 per cent; Beaverhead, 9.7 per cent.

Timothy and clover mixed.—Ravalli County, 26.1 per cent; Park, 11.4 per cent; Powell, 10.3 per cent.

Clover alone.—Gallatin County, 75.1 per cent; Carbon, 7.7 per cent; Ravalli, 6.1 per cent.

Alfalfa.—Carbon County, 14.1 per cent; Sweet Grass, 11.7 per cent; Yellowstone, 10.7 per cent.

Wild, salt, or prairie grasses.—Beaverhead County, 36.1 per cent; Meagher, 10.5 per cent; Chouteau, 8.3 per cent.

Potatoes.—Ravalli County, 19.6 per cent; Yellowstone, 12.5 per cent; Madison, 9 per cent.

Sugar beets.—Yellowstone County, 57.2 per cent; Carbon, 41.9 per cent.

Orchard fruits.—Ravalli County, 63.8 per cent; Carbon, 11.5 per cent; Missoula, 10.7 per cent.

Small fruits.—Ravalli County, 28.8 per cent; Gallatin, 14.8 per cent; Yellowstone, 14 per cent.

Of the acreage of orchards not bearing that was irrigated in 1909, 3,942 acres, 67 per cent was in Ravalli County, 14.2 per cent in Yellowstone County, and 12.1 per cent in Carbon County.

Yield.—In the following table the average yields per acre of crops extensively grown, both with and without irrigation, are shown. The yields on unirrigated land are obtained by subtracting the totals for irrigated crops from the totals for the state.

CROP.	AVERAGE YIELD PER ACRE.		
	Unirrigated land.	Irrigated land. ¹	
		Amount.	Per cent excess over yield on unirrigated land.
Corn.....bushels..	28.3	31.4	11.0
Oats.....bushels..	39.4	43.6	10.7
Wheat.....bushels..	23.6	27.1	14.8
Barley.....bushels..	26.7	29.5	10.5
Timothy alone.....tons..	1.37	1.56	13.9
Timothy and clover mixed.....tons..	1.77	1.70	-4.0
Clover alone.....tons..	2.15	2.05	-4.7
Alfalfa.....tons..	2.07	2.81	35.7
Wild, salt, or prairie grasses.....tons..	0.98	1.03	5.1
Potatoes.....bushels..	136.0	174.1	28.0

¹ A minus sign (—) indicates that the yield on irrigated land is less than that on unirrigated land.

For all the crops given in the table, except timothy and clover mixed and clover alone, there were greater average yields in 1909 on irrigated than on unirrigated land. The relative excess is greatest in the

case of alfalfa and next greatest in the case of potatoes.

Among the cereals the excess of the average yield under irrigation over that without irrigation ranges between 10 and 15 per cent. In the case of three of the hay and forage crops the average yield on irrigated land was greater than that on unirrigated land, the excess being 35.7, 13.9, and 5.1 per cent, respectively, while for two a greater average yield on unirrigated land is reported.

In considering these comparisons it should be borne

in mind that they are not comparisons of yields on irrigated and on unirrigated land in the same localities, but of yields under irrigation in localities where crops can not be grown to advantage without it with yields in localities where irrigation is not necessary. They do not indicate, therefore, the relative advantages of farming with and without irrigation in a given community, but rather give one factor for determining the relative advantages of farming where irrigation is necessary and where it is not necessary for the successful growing of crops.

COUNTY TABLE.

The next table gives in detail, by counties, the data summarized above, except those relating to crops. For purposes of comparison the total number of farms in the state, the approximate land area of the state, the total land in farms, and the improved land in farms have been included in the table. The approximate land area of the state includes 115,840 acres in Yellowstone National Park not included elsewhere.

Certain enterprises extend into more than one county, and in the case of some of these enterprises the reports do not segregate the data by counties. In such cases a distribution has been made according to the best estimates possible from all the information in the possession of the bureau. It is believed that these estimates are approximately correct.

Attention is again directed to the fact that the totals for 1899 and 1900 do not include data for Indian reservations, no report on irrigation on reservations in Montana having been made by the Twelfth Census. Since the figures for the present census show that but a small percentage of the irrigation operations in the state were conducted on reservations, it is believed that this

shortage in the earlier figures is not of material consequence as concerns comparisons with the returns of the Thirteenth Census. For this reason the percentages of increase have been computed without attempt to estimate totals for Indian Service irrigation in 1899 and 1900 or without elimination from the 1909 and 1910 totals of the figures for irrigation on reservations as presented in this report.

Change of boundaries.—In comparing the data secured in 1910 with those of 1900, the following changes in county boundaries should be considered: Lincoln County was organized from a part of Flathead County in 1909; Powell County was organized from a part of Deer Lodge County in 1901; Rosebud County was organized from parts of Custer County and Crow Indian Reservation in 1901; Sanders County was organized from a part of Missoula County in 1906; and a part of Silver Bow County was annexed to Deer Lodge County in 1903. Through a relocation of the boundary line between Idaho and Montana 272,000 acres which were in Idaho in 1900 are now in Beaverhead, Gallatin, and Madison Counties, Mont.

STATISTICS OF IRRIGATION—MONTANA.

AREA IRRIGATED, AND EXTENT AND COST OF IRRIGATION ENTERPRISES AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics.]

		THE STATE.	Beaver-head.	Broad-water.	Carbon.	Cascade.	Chouteau.	Custer. ¹	Dawson.	Deer Lodge. ¹
1	Number of all farms in 1910.....	26,214	536	390	1,264	1,502	1,818	1,622	1,947	171
2	Number of farms irrigated in 1909.....	8,970	480	231	912	194	351	129	100	170
3	Per cent of all farms.....	34.2	89.6	59.2	72.2	12.9	19.5	8.0	5.1	99.4
4	Number of farms irrigated in 1899.....	8,043	437	190	716	218	397	253	20	495
5	Per cent of increase, 1899-1909.....	11.6	5.0	21.6	27.4	211.0	210.8		400.0	
LAND AND FARM AREA										
6	Approximate land area.....acres.	93,568,040	3,020,160	764,160	1,560,320	2,165,790	10,222,080	8,419,840	8,467,840	479,360
7	Land in farms.....acres.	13,545,603	401,315	183,887	286,449	1,001,534	1,000,021	931,581	607,078	70,994
8	Improved land in farms.....acres.	3,640,309	275,530	58,777	120,409	220,340	247,930	124,607	183,163	28,452
9	Acreage irrigated in 1909.....	1,679,084	221,716	39,612	121,174	25,063	110,201	19,399	11,158	29,881
10	Per cent of total land area.....	1.8	7.3	5.2	7.8	1.2	1.1	0.2	0.1	6.2
11	Per cent of land in farms.....	12.4	48.1	21.5	42.3	2.5	11.0	2.1	1.8	42.1
12	Per cent of improved land in farms.....	46.1	80.5	67.4	100.6	11.4	44.5	15.6	6.1	105.0
13	Acreage irrigated in 1899.....	951,154	138,022	30,144	51,287	27,593	49,086	18,659	899	78,118
14	Per cent of increase, 1899-1909.....	76.5	60.6	31.4	136.3	24.2	124.7		1,016.9	
15	Acreage enterprises were capable of irrigating in 1910.....	2,295,155	238,267	50,870	129,922	50,331	138,063	32,872	46,741	39,949
16	Acreage included in projects.....	3,315,602	347,877	72,436	165,509	81,279	193,849	57,191	73,061	45,858
ACREAGE IRRIGATED AND INCLUDED IN PROJECTS										
CLASSIFIED BY CHARACTER OF ENTERPRISE.										
17	U. S. Reclamation Service, irrigated in 1909.....	14,077				964			7,113	
18	Enterprises were capable of irrigating in 1910.....	85,245				16,703			39,737	
19	Included in projects.....	113,744				16,703			64,622	
20	U. S. Indian Service, irrigated in 1909.....	67,417					16,000			
21	Enterprises were capable of irrigating in 1910.....	114,340					20,000			
22	Included in projects.....	440,940					29,600			
23	Carey Act enterprises, irrigated in 1909.....	9,648								
24	Enterprises were capable of irrigating in 1910.....	49,500								
25	Included in projects.....	306,997	69,420							
26	Irrigation districts, irrigated in 1909.....	412								
27	Enterprises were capable of irrigating in 1910.....	6,640								
28	Included in projects.....	6,640								
29	Cooperative enterprises, irrigated in 1909.....	333,926	10,100	3,000	82,014	7,000	34,343	5,900		
30	Enterprises were capable of irrigating in 1910.....	373,022	10,100	4,000	53,539	9,000	37,193	12,300		
31	Included in projects.....	518,209	12,600	12,000	65,001	29,500	32,343	10,800		
32	Commercial enterprises, irrigated in 1909.....	62,544								
33	Enterprises were capable of irrigating in 1910.....	80,895								
34	Included in projects.....	146,852								
35	Individual and partnership enterprises, irrigated in 1909.....	1,191,060	211,616	36,612	69,160	17,099	59,948	13,499	4,045	29,881
36	Enterprises were capable of irrigating in 1910.....	1,495,513	228,167	46,870	76,383	24,631	80,870	27,572	7,004	39,949
37	Included in projects.....	1,982,220	265,867	60,436	100,508	35,076	111,906	37,391	8,439	45,858
ACREAGE IRRIGATED										
CLASSIFIED BY SOURCE OF WATER SUPPLY.										
38	Supplied from streams.....	1,632,610	219,996	36,330	119,432	23,458	103,161	14,540	10,879	27,915
39	By gravity.....	1,624,650	219,996	36,310	119,174	23,173	100,635	13,885	9,939	27,915
40	By pumping.....	7,963		20	258	285	2,526	655	940	
41	Supplied from lakes.....	5,622								250
42	By gravity.....	5,617								250
43	By pumping.....	5								
44	Supplied from wells.....	262		8	200			5	19	
45	Flowing.....	207			200			5		
46	By pumping.....	55		8					19	
47	Supplied from springs.....	17,967	1,720	2,883	1,417	623	525	264	20	1,716
48	Supplied from reservoirs.....	23,614	391	125	982	982	6,605	4,690	240	
49	Total acreage supplied from pumps.....	8,023		28	258	285	2,526	655	959	
IRRIGATION ENTERPRISES										
50	Independent enterprises.....number.....	5,534	446	180	288	93	247	89	30	161
51	Number in 1899.....	2,902	403	108	171	59	105	111	7	166
52	Per cent of increase, 1899-1910.....	90.7	10.7	66.7	68.4	57.6	135.2		328.6	
53	Main ditches.....number.....	6,673	901	221	284	100	306	78	27	200
54	Number in 1899.....	2,902	403	108	171	59	105	111	7	166
55	Per cent of increase, 1899-1910.....	129.9	123.6	104.6	66.1	69.5	191.4		285.7	
56	Length.....miles.....	12,990	1,415	417	805	217	747	169	108	341
57	Length in 1899.....miles.....	6,812	600	235	457	225	276	163	6	399
58	Per cent of increase, 1899-1910.....	90.7	135.8	77.4	76.1	23.6	170.7		1,700.0	
59	Capacity.....cubic feet per second.....	83,849	8,596	1,938	4,112	1,019	5,302	1,143	1,275	1,677
60	Laterals.....number.....	8,307	1,193	93	401	192	630	110	56	155
61	Length.....miles.....	5,944	555	61	335	156	344	70	143	79
62	Reservoirs.....number.....	827	27	14	8	62	137	74	16	20
63	Capacity.....acre-feet.....	580,261	158,772	490	467	30,772	44,146	7,728	1,119	143
64	Flowing wells.....number.....	15			1			4		
65	Capacity.....gallons per minute.....	22,185			2,138			42		
66	Pumped wells.....number.....	10		3					2	
67	Capacity.....gallons per minute.....	5,203		195					4,550	
68	Pumping plants.....number.....	125		4		11	21	8	12	
69	Engine capacity.....horsepower.....	3,511		16	59	377	709	588	205	
70	Pump capacity.....gallons per minute.....	281,199		1,438	1,182	20,225	51,244	42,925	23,942	
COST										
71	Cost of enterprises up to July 1, 1910.....dollars.....	22,970,958	4,093,286	379,481	546,864	532,204	849,450	375,414	2,819,774	139,766
72	Cost in 1899.....dollars.....	4,635,973	239,100	141,360	230,000	179,520	180,595	259,555	8,050	303,000
73	Per cent of increase, 1899-1910.....	399.5	1,284.7	168.7	137.8	363.6	370.4		34,928.2	
74	Average cost per acre enterprises were capable of irrigating in 1910.....dollars.....	10.42	16.80	7.46	4.21	16.53	6.15	11.42	60.33	3.50
75	Average cost per acre irrigated in 1899.....dollars.....	4.92	2.09	4.09	4.48	6.51	3.68	13.91	8.06	8.88
76	Estimated final cost of existing enterprises.....dollars.....	32,407,452	4,093,286	379,681	546,864	912,194	890,801	379,409	3,158,950	139,766
77	Average per acre included in projects.....dollars.....	9.22	11.51	5.24	3.30	11.22	4.60	6.63	43.24	3.05
OPERATION AND MAINTENANCE										
78	Acreage for which cost is reported.....	394,507	10,100	3,000	52,014	7,064	34,343	5,900	7,113	
79	Total cost reported.....dollars.....	349,662	2,402	879	10,584	20,700	7,447	8,500	113,680	
80	Average per acre for which cost is reported.....dollars.....	0.89	0.24	0.29	0.38	2.60	0.22	1.49	15.93	
81	Average cost per acre in 1899.....dollars.....	0.28								
82	Per cent of increase, 1899-1909.....	217.9								

¹ Change of boundary. (See explanation at close of text.)
² Decrease.
³ Includes 115,840 acres in Yellowstone National Park.

⁴ Acreage irrigated includes wild, salt, or prairie grasses, while improved land in farms does not.
⁵ Not reported by counties in 1899.

AREA IRRIGATED, AND EXTENT AND COST OF IRRIGATION ENTERPRISES AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910—Continued.

(Comparative data for 1899 in italics.)

	Fergus.	Flathead. ¹	Gallatin.	Granite.	Jefferson.	Lewis and Clark.	Lincoln.	Madison.	Meagher.	Missoula.
1	2,310	1,189	1,260	295	301	529	298	730	400	670
2	191	63	802	175	188	205	54	592	176	333
3	8.3	5.3	63.7	59.3	62.5	55.8	18.1	81.1	44.0	49.7
4	452	116	659	108	200	370	(1)	593	173	364
5	57.7		21.7	4.2	8.7	20.3		0.2	1.7	
LAND AND FARM AREA										
6	5,809,920	3,884,800	1,608,320	1,047,080	1,056,000	2,217,600	2,259,200	2,931,840	2,410,240	2,715,520
7	1,201,831	239,445	631,902	134,807	124,437	494,278	64,056	421,271	710,332	185,294
8	387,000	105,679	279,908	49,660	37,737	78,441	15,090	140,100	119,740	73,985
9	48,232	14,527	127,449	24,107	23,314	38,391	2,105	102,179	102,090	42,680
10	0.8	0.4	7.9	2.3	2.2	1.7	0.1	3.5	4.2	1.6
11	4.0	6.1	24.0	17.9	18.7	7.8	3.3	24.3	14.4	23.0
12	12.5	13.7	45.5	55.2	61.7	48.9	13.0	72.9	85.3	57.7
13	71,152	6,074	60,267	18,519	16,149	30,663	(1)	74,980	43,813	15,500
14	32.2		111.5	30.2	44.4	25.2		36.3	136.2	57.7
15	84,558	19,908	139,050	28,350	26,373	55,317	3,081	118,115	128,209	47,917
16	100,364	80,287	169,026	33,916	37,494	107,789	4,281	191,230	148,373	127,779
ACREAGE IRRIGATED AND INCLUDED IN PROJECTS										
CLASSIFIED BY CHARACTER OF ENTERPRISE.										
17	U. S. Reclamation Service, irrigated in 1909.									
18	Enterprises were capable of irrigating in 1910									
19	Included in projects									
20	U. S. Indian Service, irrigated in 1909.									
21	Enterprises were capable of irrigating in 1910									
22	Included in projects									
23	Carey Act enterprises, irrigated in 1909.									
24	Enterprises were capable of irrigating in 1910									
25	Included in projects									
26	Irrigation districts, irrigated in 1909.									
27	Enterprises were capable of irrigating in 1910									
28	Included in projects									
29	Cooperative enterprises, irrigated in 1909.									
30	Enterprises were capable of irrigating in 1910									
31	Included in projects									
32	Commercial enterprises, irrigated in 1909.									
33	Enterprises were capable of irrigating in 1910									
34	Included in projects									
35	Individual and partnership enterprises, irrigated in 1909.									
36	Enterprises were capable of irrigating in 1910									
37	Included in projects									
ACREAGE IRRIGATED										
CLASSIFIED BY SOURCE OF WATER SUPPLY.										
38	Supplied from streams.									
39	By gravity									
40	By pumping									
41	Supplied from lakes.									
42	By gravity									
43	By pumping									
44	Supplied from wells.									
45	Flowing									
46	By pumping									
47	Supplied from springs.									
48	Supplied from reservoirs									
49	Total acreage supplied from pumps									
IRRIGATION ENTERPRISES										
50	Independent enterprises.									
51	Number in 1899									
52	Per cent of increase, 1899-1910									
53	Main ditches.									
54	Number in 1899									
55	Per cent of increase, 1899-1910									
56	Length.									
57	Length in 1899									
58	Per cent of increase, 1899-1910									
59	Capacity.									
60	Laterals									
61	Length									
62	Reservoirs									
63	Capacity									
64	Flowing wells.									
65	Capacity									
66	Pumped wells.									
67	Capacity									
68	Pumping plants.									
69	Engine capacity									
70	Pump capacity									
COST										
71	Cost of enterprises up to July 1, 1910.									
72	Cost in 1899									
73	Per cent of increase, 1899-1910									
74	Average cost per acre enterprises were capable of irrigating in 1910									
75	Average cost per acre irrigated in 1899									
76	Estimated final cost of existing enterprises									
77	Average per acre included in projects									
OPERATION AND MAINTENANCE										
78	Acreage for which cost is reported									
79	Total cost reported									
80	Average per acre for which cost is reported									
81	Average cost per acre in 1899									
82	Per cent of increase, 1899-1909									

¹ Change of boundary. (See explanation at close of text.)

² Decrease.

STATISTICS OF IRRIGATION—MONTANA.

AREA IRRIGATED, AND EXTENT AND COST OF IRRIGATION ENTERPRISES AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910—Continued.

[Comparative data for 1899 in italics.]

	Park.	Powell.	Ravalli.	Rosebud.	Sanders.	Silver Bow. ¹	Sweet Grass.	Teton.	Valley.	Yellowstone.
1	730	377	1,055	961	211	230	473	1,187	1,946	1,812
2	463	278	975	179	62	84	332	179	179	800
3	63.4	73.7	92.4	18.6	29.4	36.5	70.2	15.1	9.2	44.2
4	<i>416</i>	(¹)	<i>304</i>	(¹)	(¹)	<i>101</i>	<i>526</i>	<i>175</i>	<i>50</i>	<i>285</i>
5	11.6	(¹)	21.3	(¹)	(¹)	(¹)	1.8	2.3	258.0	180.7
LAND AND FARM AREA										
6	1,712,000	1,637,760	1,566,080	6,184,320	1,829,700	446,720	1,867,520	4,851,840	8,649,600	3,666,560
7	523,317	370,984	209,266	900,810	55,917	54,592	457,715	530,714	576,130	1,215,046
8	110,802	69,350	100,693	53,867	12,421	10,547	107,563	217,052	165,043	240,288
9	78,722	51,373	93,441	33,271	3,101	7,385	58,963	99,711	52,320	97,420
10	4.6	3.1	6.0	0.5	0.2	1.7	3.2	2.1	0.6	0.6
11	15.0	13.8	44.7	3.7	5.5	13.5	12.9	15.8	9.1	8.0
12	71.0	74.1	87.6	61.8	25.0	44.8	54.8	45.9	31.7	40.5
13	<i>22,917</i>	(¹)	<i>67,249</i>	(¹)	(¹)	<i>10,049</i>	<i>37,394</i>	<i>30,784</i>	<i>9,878</i>	<i>35,364</i>
14	163.1	(¹)	33.9	(¹)	(¹)	(¹)	57.3	223.0	420.7	175.5
15	99,862	60,643	118,984	64,452	4,101	8,646	82,978	140,444	64,261	182,888
16	140,533	81,360	202,266	92,217	9,812	10,050	142,178	362,186	203,256	220,206
ACREAGE IRRIGATED AND INCLUDED IN PROJECTS										
CLASSIFIED BY CHARACTER OF ENTERPRISE.										
17										6,000
18										28,805
19										32,419
20				6,854					3,000	20,563
21				18,235					3,000	52,005
22				24,335				53,000	132,000	52,005
23								1,517		8,131
24							1,000	25,000		23,500
25							18,000	150,022		27,019
26			400							
27			3,000							
28			3,000							
29	7,267	800	16,500	7,820			2,560	65,000	11,580	49,139
30	9,610	1,000	16,800	14,120			2,900	69,000		59,265
31	17,315	1,000	17,100	16,020			6,600	97,000	15,940	84,065
32			24,544	9,000					6,000	5,000
33			34,000	17,495					6,000	5,400
34			86,300	26,152					6,000	5,400
35	71,455	50,573	51,097	10,097	3,101	7,385	56,403	33,194	31,740	8,587
36	90,252	59,643	65,184	14,502	4,101	8,646	79,078	46,444	43,281	13,913
37	132,218	80,360	95,896	25,710	9,812	10,059	117,878	56,104	49,316	19,298
ACREAGE IRRIGATED										
CLASSIFIED BY SOURCE OF WATER SUPPLY.										
38	78,104	50,768	88,218	32,953	2,517	7,142	58,637	97,072	47,610	97,400
39	78,100	50,768	88,218	31,356	2,517	7,132	58,587	97,072	46,485	97,154
40	4			1,597		10	50		1,125	246
41		140	5,000		5			179		
42		140	5,000		5			179		
43										
44				13	7					
45										
46				13	7					
47	533	440	223	80	572	243	300	1,300		
48	85	25		225			26	1,160	4,710	20
49	4		1,610		12	10	50		1,125	246
IRRIGATION ENTERPRISES										
50	363	302	350	90	61	79	232	118	126	71
51	<i>208</i>	(¹)	<i>277</i>	(¹)	(¹)	<i>37</i>	<i>174</i>	<i>43</i>	<i>21</i>	<i>51</i>
52	74.5		26.4				33.3	174.4	500.0	39.2
53	361	368	364	102	62	97	249	136	123	102
54	<i>208</i>	(¹)	<i>277</i>	(¹)	(¹)	<i>37</i>	<i>174</i>	<i>43</i>	<i>21</i>	<i>51</i>
55	73.6		31.4				43.1	214.0	485.7	100.0
56	729	563	682	284	66	109	644	468	203	516
57	<i>498</i>	(¹)	<i>395</i>	(¹)	(¹)	<i>108</i>	<i>349</i>	<i>234</i>	<i>197</i>	<i>178</i>
58	47.0		72.7				84.5	100.0	3.0	180.0
59	3,065	2,563	4,235	1,921	184	436	3,795	3,693	5,081	4,671
60	635	290	295	89	79	73	766	406	83	205
61	435	137	264	71	24	37	384	848	53	333
62	41	40	46	17		19	12	25	63	17
63	5,747	5,502	57,450	778		162	17,767	174,201	46,823	174
64								9		
65								20,000		
66				1	2					
67				176	177					
68	1			18	3	1	1		24	6
69	1			566	5	6	10		514	342
70	64			38,567	197	200	1,350		52,320	30,898
COST										
71	470,173	306,173	960,144	1,007,778	27,869	80,435	834,057	1,221,220	508,449	3,094,500
72	<i>188,446</i>	(¹)	<i>374,498</i>	(¹)	(¹)	<i>45,600</i>	<i>153,050</i>	<i>80,000</i>	<i>80,000</i>	<i>266,900</i>
73	149.5		67.1				275.9	697.9	535.6	1,059.4
74	4.71	5.05	8.07	15.64	6.80	9.30	10.05	8.70	7.91	16.92
75	<i>6.30</i>	(¹)	<i>8.54</i>	(¹)	(¹)	<i>4.33</i>	<i>5.92</i>	<i>4.97</i>	<i>8.10</i>	<i>7.55</i>
76	470,173	306,173	1,210,469	1,286,565	27,869	80,435	834,057	2,984,220	2,621,041	3,178,630
77	3.14	3.76	5.98	13.95	2.84	8.00	5.87	8.24	12.90	14.43
OPERATION AND MAINTENANCE										
78	7,267	800	31,794	12,820			2,560	65,000	15,600	68,131
79	3,305	350	34,363	5,499			1,155	4,500	5,254	92,658
80	0.45	0.44	1.08	0.43			0.45	0.07	0.34	1.36
81										
82										

¹ Change of boundary. (See explanation at close of text.)

IRRIGATION : NEVADA

FARMS AND ACREAGE IRRIGATED, IRRIGATION WORKS, COST OF CONSTRUCTION, COST OF OPERATION AND MAINTENANCE,
AND CROPS IRRIGATED

Prepared under the supervision of LE GRAND POWERS, Chief Statistician for Agriculture, by R. P. TEELE, Special Agent in Charge of Irrigation

INTRODUCTION.

This bulletin presents the larger part of the statistics of irrigation for Nevada obtained in connection with the Thirteenth Census. These data, with additional information, will be embodied in a special report of the Census of Irrigation and in the final reports of the Thirteenth Census. The statistics of the number of farms and acreage irrigated, cost of operation and maintenance, and irrigated crops are for the calendar year 1909; those of irrigation works, cost of enterprises, acreage enterprises were capable of irrigating in 1910, and acreage included in projects are of the date July 1, 1910.

These statistics have been collected under the law of February 25, 1910, which contained the following clause relating to irrigation:

Inquiries shall also be made as to the location and character of irrigation enterprises, quantity of land irrigated in the arid region of the United States and in each state and county in that section under state and Federal laws; the price at which these lands, including water rights, are obtainable; the character and value of crops produced on irrigated lands, the amount of water used per acre for said irrigation and whether it was obtainable from national, state, or private works; the location of the various projects and methods of construction, with facts as to their physical condition; the amount of capital invested in such irrigation works.

The information called for by this law which could be supplied by farm operators was obtained on supplemental schedules by the regular census enumerators as a part of the agricultural census. The remaining data, which were supplied by the owners or officials of irrigation enterprises, were obtained on special schedules by special agents. The data relating to number of farms irrigated and irrigated crops are taken from the supplemental schedules, while all data relating to acreage irrigated and to irrigation works and their construction and operation are taken from the special schedules.

In accordance with the law, the data collected have been classified primarily on the basis of the state and Federal laws by virtue of which the land was brought under irrigation. The results are presented in detail at the end of this bulletin and summarized in text tables.

Such of the terms used as are not self-explanatory are defined below.

Farms irrigated.—The number of "farms irrigated" is the number of farms on which irrigation is practiced and is equivalent to the term "number of irrigators" used in previous census reports.

Types of enterprise.—The types of enterprise under which the lands irrigated in 1909 are classified are as follows:

United States Reclamation Service enterprises, which operate under the Federal law of June 17, 1902, providing for the construction of irrigation works with the receipts from the sale of public lands.

United States Indian Service enterprises, which operate under various acts of Congress providing for the construction by that service of works for the irrigation of land in Indian reservations.

Carey Act enterprises, which operate under the Federal law of August 18, 1894, granting to each of the states in the arid region 1,000,000 acres of land on condition that the state provide for its irrigation, and under amendments to that law granting additional areas to Idaho and Wyoming.

Irrigation districts, which are public corporations that operate under state laws providing for their organization and management, and empowering them to issue bonds and levy and collect taxes with the object of obtaining funds for the purchase or construction and for the operation and maintenance of irrigation works.

Cooperative enterprises, which are controlled by the water users under some organized form of cooperation. The most common form of organization is the stock company, the stock of which is owned by the water users.

Commercial enterprises, which supply water for compensation to parties who own no interest in the works. Persons obtaining water from such enterprises are usually required to pay for the right to receive water, and to pay, in addition, annual charges based in some instances on the acreage irrigated and in others on the quantity of water received.

Individual and partnership enterprises, which belong to individual farmers or to neighboring farmers, who control them without formal organization. It is not always possible to distinguish between partnership and cooperative enterprises, but as the difference is slight this is unimportant.

Source of water supply.—Of the terms used in the classification according to source of water supply, none requires explanation except "reservoirs." The only reservoirs which are treated as independent sources of supply are those filled by collecting storm water or from watercourses that are ordinarily dry. When reservoirs are filled from streams or wells, the primary source is considered the source of supply.

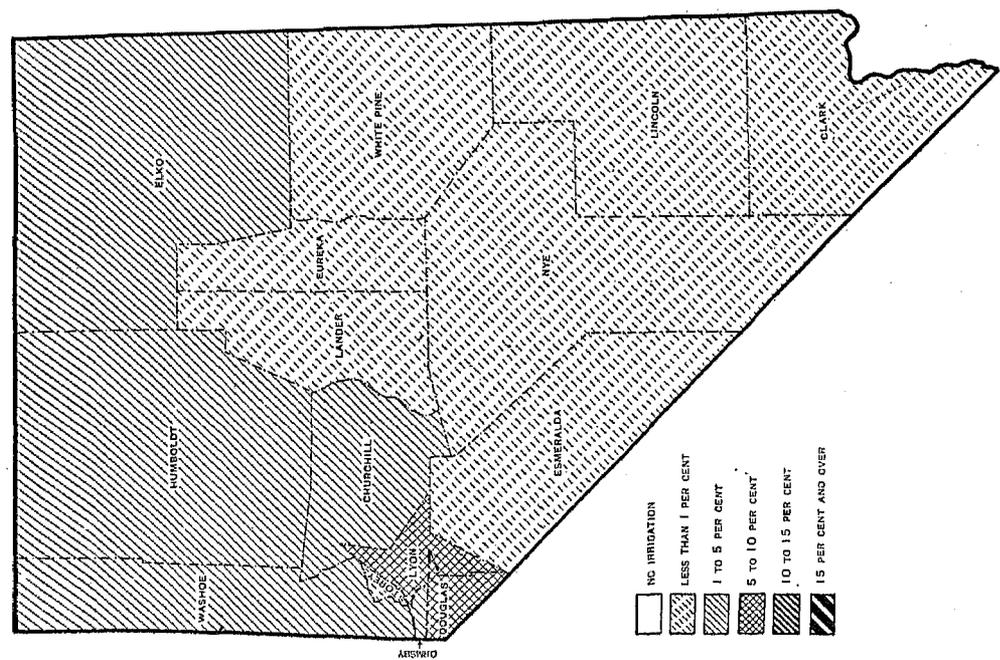
Acre-foot.—The "acre-foot," used to express the capacity of reservoirs, is the volume of water required to cover 1 acre to a depth of 1 foot, or 43,560 cubic feet.

Cost.—The cost of irrigation enterprises is that given by the owners. For the larger works the cost given is taken, in most cases, from the books of account and represents the actual cost. In the case of most of the private and partnership and many of the cooperative enterprises, however, the works were built by their owners without records of money or labor expended, and the cost given represents the owners' estimates. The cost reported for 1910 includes the cost of construction and of acquiring rights. The latter usually consists of filing fees only. In some instances it includes the purchase price of rights, but these cases are so rare that they are unimportant. The cost reported for 1899 is designated "cost of construction," but probably includes the cost of acquiring rights, as in 1910. The average cost per acre is based on the acreage enterprises were capable of irrigating in 1910 and the cost to July 1, 1910.

PER CENT OF TOTAL LAND AREA IRRIGATED, AND PER CENT OF NUMBER OF FARMS IRRIGATED, IN NEVADA,
 BY COUNTIES: 1909.

PER CENT OF TOTAL LAND AREA IRRIGATED.

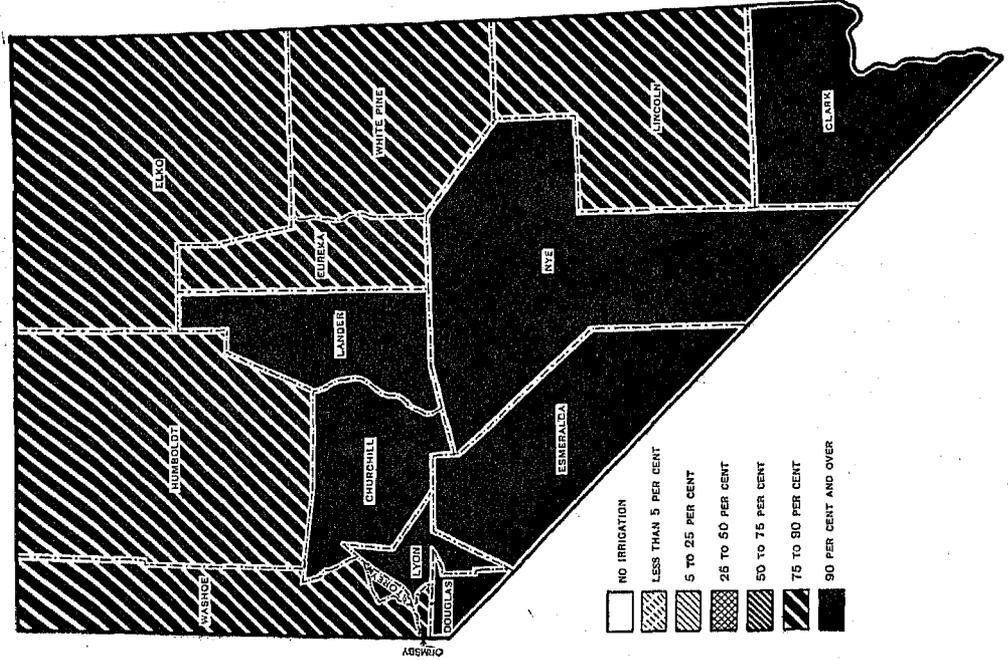
[Per cent for the state, 14]



(2)

PER CENT OF NUMBER OF FARMS IRRIGATED.

[Per cent for the state, 89.5.]



FARMS AND ACREAGE IRRIGATED.

Irrigation is an essential feature of successful agriculture throughout Nevada. The state is an arid plateau lying almost entirely within the Great Basin and shut in on either side by ranges of mountains. To the west are the Sierra Nevada Mountains, which effectually keep off the rain-bearing clouds of the Pacific, and the Wasatch Mountains and numerous detached ranges form a similar barrier to the east. The rainfall, except for isolated spots, is insufficient for the growing of crops without irrigation, the normal annual precipitation being less than 10 inches. The location of the irrigated lands of the state is indicated in a general way by the accompanying maps, in which the different counties are graphically classified according to the percentage which irrigated land forms of the total land area and the percentage which irrigated farms represent of all farms.

The following table shows, for the state as a whole, the number of farms and acreage irrigated in 1909, in

comparison with the total number of farms, the total land area, the total land in farms, and the total acreage of improved land in farms in 1910, together with the areas not yet irrigated for which water has been or is being made available. Comparative data for the census of 1900 are included as far as possible. The figures in respect to the number of farms and acreage irrigated in 1899 do not include statistics for Indian reservations, which are not shown in the irrigation report for the state for that year, and therefore they are not strictly comparable with those for the total number of farms and total farm acreage in 1900, as shown in this table, or with the statistics for farms and acreage irrigated in 1909. Since, however, irrigated farms and land on reservations formed only small proportions of the totals for the state in 1909, comparisons shown in the table which follows are but little affected by the omission in the Twelfth Census report.

	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Number of all farms.....	¹ 2,689	² 2,184	505	23.1
Approximate land area of the state..... acres.	70,285,440	70,285,440		
Land in farms..... acres.	¹ 2,714,757	² 2,565,647	149,110	5.8
Improved land in farms..... acres.	¹ 752,117	² 572,946	179,171	31.3
Number of farms irrigated.....	³ 2,406	⁴ 1,906	500	26.2
Acreage irrigated.....	³ 701,833	⁴ 504,168	197,665	39.2
Acreage enterprises were capable of irrigating.....	⁵ 840,962	⁽⁶⁾		
Acreage included in projects.....	⁶ 1,232,142	⁽⁶⁾		
Percentage irrigated of—				
Number of all farms.....	89.5	⁷ 92.5		
Approximate land area of the state.....	1.0	⁷ 0.7		
Land in farms.....	25.9	⁷ 19.7		
Improved land in farms.....	93.3	⁷ 88.4		
Excess of acreage enterprises were capable of irrigating in 1910 over acreage irrigated in 1909.....	139,129			
Excess of acreage included in projects over acreage irrigated in 1909.....	530,309			

¹ April 15.² June 1.³ In 1909.⁴ In 1899, exclusive of Indian reservations.⁵ July 1.⁶ Not reported.⁷ Based on figures which are exclusive of Indian reservations.

Number of farms irrigated.—The number of farms irrigated is made up of the number reported on the supplemental schedules by the regular enumerators, together with an estimate of the number of farms covered by enterprises which were reported by special agents but not by the regular enumerators. This estimate was based upon the average acreage irrigated per farm as shown by the supplemental schedules. According to the figures presented in the table, irrigation was practiced on nearly nine-tenths (89.5 per cent) of the farms of the state in 1909. In 1899 the proportion of irrigated farms among those outside of Indian reservations was slightly higher, 92.5 per cent, while in 1889 the proportion was 91.4 per cent. It is evident that between 1889 and 1899 the number of irrigated farms in the state increased at a more rapid rate than the number of unirrigated farms.

The rate of increase during the later decade in the number of irrigated farms can not be determined exactly, as the number of irrigated farms on Indian reservations in 1910 were not reported.

In 8 of the 15 counties in the state more than 90 per cent of the farms are irrigated, in 5 the proportion is between 85 and 90 per cent, while in the remaining 2 counties it is between 80 and 85 per cent. In Douglas County every farm was reported as irrigated, and in Clark and Lander Counties every farm but one. The county in which the proportion that irrigated farms form of all farms is lowest is White Pine, the percentage being 80.8.

From 1899 to 1909 the increase in the number of farms reported as irrigated was 26.2 per cent for the state as a whole. This rate of gain was exceeded in only 3 counties, namely, Churchill, Esmeralda, and

Nye, for which the percentages are, respectively, 359.2, 182.9, and 32.5. The percentage of increase shown for Esmeralda is probably excessive, owing to the fact that statistics for an Indian reservation partly located in this county are not included in the figure for 1899. The territory which comprised Lincoln County in 1899 and Clark and Lincoln Counties in 1909 shows an increase of 27.1 per cent. In 3 counties (not including Lincoln) decreases in the number of farms irrigated took place and in 1 county the number remained stationary. In each of these counties there was an increase in the acreage irrigated, indicating an increase in the acreage irrigated per farm.

Acreage irrigated.—The acreage irrigated is taken from the special schedules filled out by agents from information secured from owners or officials of irrigation enterprises and, in some instances, from public records. The acreage thus obtained is considerably larger than the irrigated acreage reported on the supplemental schedules filled out by the farm enumerators. This difference is due in a measure to the fact that the special agents found enterprises which were not reported on any schedules returned by the enumerators, indicating that the acreage reported on the supplemental schedules is under the true figure. There is, however, a natural tendency for the officials of irrigation enterprises to report as irrigated the entire area of farms of which only a part was irrigated. Furthermore, some farms are so situated as to receive water from more than one enterprise, and may be reported as irrigated by each, which results in duplication. Owing to the two causes last enumerated, it is probable that the acreage irrigated, as shown in this bulletin, is somewhat excessive, but the extent of this excess can not be determined. It is believed, however, that this does not exceed 10 per cent for the state of Nevada.

The total acreage reported as irrigated in 1909 was 701,833 acres, as against 504,168 acres in 1899 and 224,403 acres in 1889. The acreage given for 1909 includes land lying in Indian reservations, while the figures for 1899 and 1889 do not, but the acreage irrigated in reservations is so small as not to change the general effect of the comparisons. The percentage of increase from 1889 to 1899 was 124.7, while that reported for the period from 1899 to 1909 was 39.2. The absolute increase during the earlier decade was 279,765 acres, as against an increase of 197,665 acres shown for the later decade.

The percentage of increase from 1899 to 1909 in the acreage irrigated was somewhat higher than that in the number of farms irrigated, the acreage irrigated per farm reported increasing from 264.5 in 1899 to 291.7 in 1909. During the same period the average size of farms in the state decreased from 1,174.7 acres to 1,009.6 acres, which change, considered in connection with the increase in the acreage irrigated per farm, indicates that farmers are irrigating larger parts of their holdings than formerly. The same tendency is shown by the increase in the ratio which the irrigated acreage bears to the total improved farm acre-

age, from 88.4 per cent in 1899 to 93.3 per cent in 1909. The latter figure, however, is somewhat higher than the actual percentage of improved land irrigated owing to the fact that irrigated land as reported at the Thirteenth Census includes wild grass land used for pasture, while improved land does not.

The percentage of the total land area of the state irrigated in 1909 was 1, as compared with 0.7 in 1899 and 0.3 in 1889. Humboldt County reported the largest acreage irrigated in 1909, the number of acres being 207,753, as against 124,959 in 1899. In the latter year Elko County had the largest irrigated acreage, 156,446 acres, and in 1909 it was next to Humboldt County in this respect, with 183,552 acres. In two other counties the area of irrigated land in 1909 exceeded 50,000 acres, while three counties contained irrigated areas of between 30,000 and 50,000 acres each. The county in which irrigated land formed the highest percentage of the total area was Douglas, where 6.9 per cent of the land area was irrigated. In only one other county, Lyon, was the proportion as high as 6 per cent, and in only two other counties, Humboldt and Ormsby, was it as high as 2 per cent.

Acreage included in projects.—The foregoing table shows that in 1910 existing enterprises were ready to supply water to 139,129 acres more than were irrigated in 1909. It is probable that, after allowance is made for an increase in the area irrigated in 1910 over that irrigated in 1909, there remained at the close of 1910 at least one-half as much land under ditch but not irrigated as had been brought under irrigation in the 10 years from 1899 to 1909. The acreage included in projects exceeds the acreage irrigated in 1909 by 530,309 acres, which is equal to more than two and one-half times the acreage brought under irrigation during the last decade and about three-fourths of the total area irrigated in 1909. This acreage represents the area which will be available for the extension of irrigation in the next few years upon the completion of the projects now under construction and without new undertakings. It indicates in a general way the area available for settlement, although much of this unirrigated land is in farms already settled.

Acreage irrigated, classified by character of enterprise.—The next table gives a distribution of the acreage irrigated in 1909 according to the character of the enterprise controlling the irrigation works. No Carey Act or irrigation district enterprises were reported in the state.

CHARACTER OF ENTERPRISE.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All classes.....	701,833	100.0
U. S. Reclamation Service.....	30,000	4.3
U. S. Indian Service.....	2,597	0.4
Cooperative enterprises.....	78,996	11.3
Commercial enterprises.....	8,864	1.3
Individual and partnership enterprises.....	581,400	82.8

Cooperative enterprises and individual and partnership enterprises, which together supplied about 94 per cent of the acreage irrigated in 1909, are all controlled by the water users, while United States Reclamation Service enterprises, which are to be turned over to the water users, supplied 4.3 per cent. Thus less than 2 per cent of the land irrigated was supplied by works which are not either controlled by the water users or to be turned over to them ultimately. The cooperative enterprises, which furnished water for 11.3 per cent of the land irrigated in 1909, are principally stock companies, of which the stock is owned by the water users.

Acreage irrigated, classified by source of water supply.—The table in the next column shows the distribution of the acreage irrigated according to the source of water supply.

SOURCE OF WATER SUPPLY.	ACREAGE IRRIGATED IN 1909.	
	Amount.	Per cent distribution.
All sources	701,833	100.0
Streams.....	661,762	94.3
Lakes.....	906	0.1
Wells.....	187	(1)
Springs.....	38,840	5.5
Reservoirs.....	138	(1)

¹ Less than one-tenth of 1 per cent.

From the foregoing table it is apparent that up to the present time there has been comparatively little development of any source of water supply other than streams.

IRRIGATION WORKS.

The table following summarizes the data collected relating to works for supplying water for irrigation in 1910 and 1900, Indian reservations, as already noted, not being represented in the figures for the earlier census. As only a few of the items reported in 1910 were reported in 1900, there is little opportunity for comparison of the two censuses. The figures shown for the earlier census relate only to those systems which received water by gravity diversion from streams. The only other irrigation works that supplied water for any of the acreage shown in the 1900 report were wells, by which only 134 acres were irrigated in 1899.

Assuming that the enterprises in operation in 1909 were identical with those reported in 1910, the average number of acres irrigated per enterprise in 1909 was 521, and the acreage irrigated per mile of main ditch was 362.1.

There has been little utilization of underground water for irrigation up to this time. The table shows 19 flowing wells, which irrigated a total of 150 acres in 1909, and 6 pumped wells, which watered only 37 acres in 1909. The flowing wells are located in Lander, Clark, and Churchill Counties, while the pumped wells

are in Humboldt, Esmeralda, Lincoln, and White Pine Counties.

Pumping for irrigation from any source has been but little practiced as yet. The total area irrigated with pumped water in 1909 was 906 acres, of which 463 acres were supplied from streams, 406 acres from lakes, and 37 acres from wells.

IRRIGATION WORKS.	CENSUS OF—		DECREASE.	
	1910	1900 ¹	Amount.	Per cent.
Independent enterprises.....number..	1,347	1,498	151	10.1
Ditches, total length.....miles..	3,151	(²)	.....	.....
Main ditches.....number..	994	1,498	504	33.6
Length.....miles..	1,938	2,859	921	32.2
Capacity.....cu. ft. per second..	17,579	(²)	.....	.....
Lateral ditches.....number..	1,531	(²)	.....	.....
Length.....miles..	1,213	(²)	.....	.....
Reservoirs.....number..	109	(²)	.....	.....
Capacity.....acre-feet..	325,953	(²)	.....	.....
Flowing wells.....number..	19	(²)	.....	.....
Capacity.....gals. per minute..	1,302	(²)	.....	.....
Pumped wells.....number..	6	(²)	.....	.....
Capacity.....gals. per minute..	1,349	(²)	.....	.....
Pumping plants.....number..	18	(²)	.....	.....
Engine capacity.....horsepower..	693	(²)	.....	.....
Pump capacity.....gals. per minute..	24,295	(²)	.....	.....

¹ Figures relate only to systems obtaining water from streams, outside of Indian reservations.
² Not reported.

COST OF CONSTRUCTION, OPERATION, AND MAINTENANCE.

The table following shows the total cost of irrigation enterprises up to July 1, 1910, including construction of works and acquisition of rights but not operation and maintenance, together with the average cost per acre, based on the acreage the enterprises were capable of irrigating in 1910; the estimated final cost of enterprises, including those completed and those under construction, with the average cost per acre, based on the acreage included in projects; and the total cost and average cost per acre of operation and maintenance in 1909. Data relating to the cost of construction and maintenance of systems operated in 1899 are included for comparison. The figure for average cost per acre of operation and maintenance in 1899 does not cover the

cost for systems receiving water from wells, but, as indicated above, these are comparatively unimportant, having supplied only 134 acres in that year. Indian reservations, as previously stated, are not covered by the figures for the earlier census.

The cost of operation and maintenance was not reported for individual and partnership enterprises, for the reason that farmers whose land is irrigated by such systems generally clean their own ditches at odd times without keeping any record of the time spent. In the case of the larger enterprises this cost represents a cash outlay by the farmers, while in the case of many of the smaller cooperative enterprises the cost is worked out by the farmers.

IRRIGATION—NEVADA.

	CENSUS OF—		INCREASE.	
	1910	1900	Amount.	Per cent.
Cost of irrigation enterprises.....	¹ \$6,721,924	² \$1,537,650	\$5,184,365	337.2
Average per acre.....	³ \$7.90	⁴ \$3.05	(⁵)	.....
Estimated final cost of existing enterprises.....	\$12,188,756	(⁶)	.....	.....
Average per acre included in projects.....	\$9.89	(⁶)	.....	.....
Operation and maintenance:				
Acreage for which cost is reported.....	⁷ 88,976	(⁶)	.....	.....
Total cost reported.....	\$86,110	(⁶)	.....	.....
Average cost per acre.....	\$0.97	⁸ \$0.18	\$0.79	498.9

¹ Reported July 1.

² Cost of systems operated in 1899, exclusive of those on Indian reservations.

³ Based on acreage enterprises were capable of irrigating in 1910.

⁴ Based on acreage irrigated in 1899, exclusive of Indian reservations.

⁵ Figures not comparable. (See explanation in text.)

⁶ Not reported.

⁷ For 1909.

⁸ Figure relates only to systems obtaining water from streams, outside of Indian reservations.

The cost of irrigation systems shows an increase of 337.2 per cent, while the average cost per acre also shows a large increase. The average cost per acre shown for 1910 is based on the acreage enterprises were capable of irrigating in that year; but since the corresponding acreage for 1900 was not reported, the figure for average cost at the earlier census was based on the acreage irrigated in 1899. If computed on the basis of the acreage irrigated in 1909, the average cost in 1910 would be \$9.58, representing an increase of 214.1 per cent over the figure for the average cost at the census of 1900. The year 1899 was near the close of the period of private and cooperative construction, when most of the works were built by the water users themselves, with little

or no expenditure of money, and near the beginning of the present period of large-scale construction by corporations and the Federal Government. This later construction is not only on a more extensive scale, but also more difficult and of a better type. Largely as a result of these changed conditions the average cost per acre of irrigation has greatly increased. A number of large enterprises are under construction, on which considerable expenditures have been made, but which are irrigating little land as yet. On some of these projects large expenditures are yet to be made, which will still further increase the average cost per acre. The average based on the estimated final cost of existing enterprises (including those completed and those under way) and the acreage included in projects in 1910 is \$9.89. This figure, however, is well under the corresponding average reported for most of the states of the arid region. The county showing the lowest average cost per acre enterprises were capable of irrigating in 1910—\$1.16—is Eureka, while the highest average cost per acre shown—\$38.06—is that in Churchill County.

The acreage for which cost of operation and maintenance in 1909 was reported forms only 12.7 per cent of the total acreage reported as irrigated in 1909, but it constitutes 73.9 per cent of the acreage reported as irrigated by other than individual and partnership enterprises. The cost reported can be said, therefore, to represent fairly the average annual expense for operation and maintenance for all but individual and partnership enterprises.

CROPS.

As previously stated, the data relating to irrigated crops are taken from supplemental schedules filled out by the regular census enumerators. Since the special agents found enterprises which the enumerators had not reported, it is evident that the information relating to irrigated crops is incomplete to some extent.

It shows, however, the relative importance of irrigated crops and affords a basis for averages of yields.

The following table shows the acreage, yield, and value of the principal crops reported as grown under irrigation, in comparison with totals for the same crops reported for the entire state:

CROP.	ACREAGE.			YIELD.			VALUE.	
	Total for state.	Irrigated.		Unit.	Total for state.	On irrigated land.	Total for state.	For irrigated land.
		Amount.	Per cent of total.					
Cereals:								
Corn.....	585	536	91.6	Bushels.....	20,779	19,085	\$23,600	\$21,766
Oats.....	7,853	7,285	92.8	Bushels.....	334,973	307,618	191,068	175,987
Wheat.....	14,260	14,010	98.2	Bushels.....	396,075	392,472	390,285	393,144
Barley.....	12,200	11,852	97.1	Bushels.....	412,149	401,450	310,394	302,229
Rye.....	43	21	48.8	Bushels.....	880	415	941	430
Other grains and seeds:								
Alfalfa seed.....	70	31	44.3	Bushels.....	221	69	1,737	800
Timothy seed.....	42	7	16.7	Bushels.....	175	23	430	192
Dry edible beans.....	14	6	42.0	Bushels.....	222	70	615	445
Hay and forage:								
Timothy alone.....	14,954	10,437	69.8	Tons.....	21,395	16,217	163,929	127,553
Timothy and clover mixed.....	17,141	9,442	55.1	Tons.....	26,157	15,607	226,179	138,871
Other tame or cultivated grasses ¹	90,151	89,904	99.7	Tons.....	238,383	237,530	1,955,980	1,951,293
Wild, salt, or prairie grasses.....	26,178	7,259	27.7	Tons.....	40,365	11,107	330,105	91,240
Grains cut green.....	197,716	195,381	98.8	Tons.....	189,338	188,582	1,420,450	1,407,590
Coarse forage.....	4,184	1,775	42.4	Tons.....	5,426	2,362	83,702	28,059
Coarse forage.....	136	78	57.4	Tons.....	730	310	3,711	1,437
Sundry crops:								
Potatoes.....	4,864	4,711	96.9	Bushels.....	766,826	728,227	396,652	394,651
Orchard fruits and grapes.....	(²)	1,276	.....	.....	.....	.....	94,740	64,136
Small fruits.....	³ 37	22	59.5	.....	.....	.....	5,683	3,582

¹ Includes millet or Hungarian grass.

² Agricultural returns show number of trees, and not acreage.

³ Preliminary tabulation, subject to correction.

While small quantities of other crops are grown both on irrigated and unirrigated land, the leading crops of the state, as well as the leading crops grown under irrigation, are represented in the table. In the reports of the agricultural census the acreages of seed crops are not generally given, but since the growing of these crops, especially alfalfa seed, is coming to be an important industry in the irrigated sections of the country, the acreages of these crops are shown here.

Acreage.—Of the entire acreage of the crops for which totals are presented in the table, slightly more than nine-tenths is irrigated, but the proportion irrigated varies widely for the different crops.

The cereals are very generally grown under irrigation, 96.5 per cent of the total acreage of the cereal crops given in the table being irrigated. The highest percentage of acreage irrigated shown for any cereal, 98.2, is reported for wheat, and the next highest, 97.1, for barley. The proportions for oats and corn are, respectively, 92.8 and 91.6 per cent.

The hay and forage crops are less generally irrigated than the cereals, the irrigated acreage forming 89.7 per cent of the total reported for these crops. In the case of five of the seven hay and forage crops included in the table, more than half of the total acreage is irrigated. The irrigated alfalfa acreage forms 99.7 per cent of the entire acreage in alfalfa, and the irrigated acreage in "wild, salt, or prairie grasses" 98.8 per cent of the total land in that crop. For timothy alone, coarse forage, and timothy and clover mixed, the corresponding percentages are 69.8, 57.4, and 55.1.

Of the entire acreage in potatoes, 96.9 per cent is irrigated, and of that in small fruits, 59.5 per cent. The relative importance of the irrigated orchard acreage can not be determined, because the total acreage of orchards in the state is not reported, but it will be observed that more than two-thirds of the value of all orchard fruits produced in the state is that of products grown on irrigated land.

Of the total acreage of the irrigated crops shown in the table, 55.2 per cent represents "wild, salt, or prairie grasses." Alfalfa is second in respect to irrigated acreage, with 25.4 per cent of this total, and is followed by wheat, with 4 per cent, and barley, with 3.3 per cent. No other single crop covers as much as 3 per cent of the total acreage of the irrigated crops presented in the table.

While most of the crops irrigated are well distributed geographically, there is a tendency toward the concen-

tration of certain crops in particular localities. This is shown by the following statement, which gives the counties having the largest acreage of the principal irrigated crops, with the proportions which they contain of the total irrigated acreages of these crops in the state:

Corn.—Lincoln County, 43.1 per cent; Clark, 21.3 per cent; Nye, 16.6 per cent.

Oats.—Elko County, 42.9 per cent; White Pine, 16.4 per cent; Douglas, 14.6 per cent.

Wheat.—Humboldt County, 31.2 per cent; Lyon, 14.2 per cent; Douglas, 14 per cent.

Barley.—Douglas County, 20.5 per cent; Churchill, 20.2 per cent; Lyon, 13.1 per cent.

Timothy alone.—Elko County, 77.4 per cent; Washoe, 9.7 per cent; Humboldt, 5.5 per cent.

Timothy and clover mixed.—Elko County, 56.7 per cent; Washoe, 24.7 per cent; Douglas, 10.2 per cent.

Alfalfa.—Humboldt County, 29.9 per cent; Lyon, 17.5 per cent; Washoe, 9.8 per cent.

"*Other tame or cultivated grasses.*"—Elko County, 57.3 per cent; Douglas, 13.9 per cent; Eureka, 9.6 per cent.

"*Wild, salt, or prairie grasses.*"—Elko County, 35.5 per cent; Humboldt, 26.7 per cent; Washoe, 7.9 per cent.

Grains cut green.—Churchill County, 38.8 per cent; Washoe, 16.4 per cent; Elko, 13.9 per cent.

Potatoes.—Lyon County, 25.9 per cent; Washoe, 25.7 per cent; Elko, 8.5 per cent.

Orchard fruits and grapes.—Washoe County, 49.5 per cent; Nye, 12 per cent; Elko, 9.1 per cent.

Yield.—In the following statement are shown the average yields per acre on irrigated land of nearly all the crops grown to any extent under irrigation. On account of the small proportion of the land in crops that was not irrigated in 1909, reliable bases for comparisons of yields on irrigated and unirrigated lands are lacking.

CROP.	Average yield per acre on irrigated land.
Corn.....	bushels.. 35.6
Oats.....	bushels.. 42.2
Wheat.....	bushels.. 28.0
Barley.....	bushels.. 33.9
Timothy alone.....	tons.. 1.55
Timothy and clover mixed.....	tons.. 1.65
Alfalfa.....	tons.. 2.64
Wild, salt, or prairie grasses.....	tons.. 0.97
Grains cut green.....	tons.. 1.33
Potatoes.....	bushels.. 154.6

IRRIGATION—NEVADA.

COUNTY TABLE.

The next table gives in detail, by counties, the data summarized above, except those relating to crops. For purposes of comparison the total number of farms in the state, the approximate land area of the state, the total land in farms, and the improved land in farms have been included in the table.

Several of the large enterprises extend into more than one county, and in some cases the reports from these enterprises do not segregate the data by counties. In such cases a distribution has been made according to the best estimates possible from all the information in the possession of the bureau. It is believed that these estimates are approximately correct.

Attention is again directed to the fact that the totals for 1899 do not cover Indian reservations, no report as to irrigation on reservations in Nevada

having been made at the Twelfth Census. Since, however, the figures for the present census show that the irrigation operations on Indian reservations are unimportant relatively to those in the state as a whole, it is believed that the omissions are so small as not to affect materially comparisons between the two censuses. For this reason the percentages of increase have been computed without attempt to estimate the extent of Indian Service irrigation in 1899, and without elimination from the 1909 and 1910 totals of the figures representing irrigation on reservations at the Thirteenth Census.

Change of boundaries.—In comparing the data secured in 1910 with those for the census of 1900, it should be borne in mind that Clark County was organized from a part of Lincoln County in 1909.

IRRIGATION—NEVADA.

ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES, AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics.]

	THE STATE.	Churchill.	Clark.	Douglas.	Elko.	Esmeralda.	Eureka.	Humboldt.	
1	Number of all farms in 1910.....	2,089	354	146	132	422	105	68	312
2	Number of farms irrigated in 1909.....	2,406	326	145	132	359	99	58	270
3	Per cent of all farms.....	89.5	92.1	99.3	100.0	85.1	94.3	85.3	86.5
4	<i>Number of farms irrigated in 1899.....</i>	<i>1,900</i>	<i>71</i>	<i>(1)</i>	<i>116</i>	<i>304</i>	<i>35</i>	<i>67</i>	<i>230</i>
5	Per cent of increase, 1899-1909.....	26.2	350.2		13.8	21.4	182.9	1.8	17.4
LAND AND FARM AREA									
6	Approximate land area..... acres.....	70,285,440	3,232,000	5,148,800	469,120	10,917,760	4,756,480	2,600,480	10,148,480
7	Land in farms..... acres.....	2,714,757	113,183	20,721	84,194	920,385	33,212	73,025	606,680
8	Improved land in farms..... acres.....	752,117	30,957	8,314	27,262	196,696	16,018	19,824	165,150
9	Acreage irrigated in 1909.....	701,833	35,114	8,116	32,181	183,552	14,011	18,715	207,753
10	Per cent of total land area.....	1.0	1.1	0.2	6.9	1.7	0.3	0.7	2.0
11	Per cent of land in farms.....	25.9	31.0	39.2	38.2	19.8	42.2	25.4	31.2
12	Per cent of improved land in farms.....	93.3	113.4	97.6	118.1	93.3	87.5	94.4	133.9
13	<i>Acreage irrigated in 1899.....</i>	<i>604,168</i>	<i>29,533</i>	<i>(1)</i>	<i>25,801</i>	<i>150,446</i>	<i>6,181</i>	<i>21,831</i>	<i>124,969</i>
14	Per cent of increase, 1899-1909.....	39.2	18.9		24.4	17.3	126.7	214.3	66.3
15	Acreage enterprises were capable of irrigating in 1910.....	840,962	42,622	16,844	35,548	139,253	14,106	21,973	228,845
16	Acreage included in projects.....	1,232,142	52,030	22,016	37,649	262,315	26,538	23,008	304,152
ACREAGE IRRIGATED AND INCLUDED IN PROJECTS									
CLASSIFIED BY CHARACTER OF ENTERPRISE.									
17	U. S. Reclamation Service, irrigated in 1909.....	30,000	28,140						
18	Enterprises were capable of irrigating in 1910.....	90,185	35,325						
19	Included in projects.....	210,185	44,545						
20	U. S. Indian Service, irrigated in 1909.....	2,597				835	1,446		200
21	Enterprises were capable of irrigating in 1910.....	3,381				835	1,446		300
22	Included in projects.....	18,060				4,460	9,000		500
23	Carey Act enterprises, irrigated in 1909.....								
24	Enterprises were capable of irrigating in 1910.....								
25	Included in projects.....								
26	Irrigation districts, irrigated in 1909.....								
27	Enterprises were capable of irrigating in 1910.....								
28	Included in projects.....								
29	Cooperative enterprises, irrigated in 1909.....	78,906		4,507					23,520
30	Enterprises were capable of irrigating in 1910.....	88,255		11,000					23,520
31	Included in projects.....	129,209		13,800					43,880
32	Commercial enterprises, irrigated in 1909.....	8,844							
33	Enterprises were capable of irrigating in 1910.....	9,300							
34	Included in projects.....	24,500							
35	Individual and partnership enterprises, irrigated in 1909.....	581,406	0,974	3,540	32,181	182,717	12,565	18,715	184,033
36	Enterprises were capable of irrigating in 1910.....	649,841	7,297	5,238	35,548	188,418	12,600	21,973	205,025
37	Included in projects.....	844,128	7,485	8,210	37,649	257,855	16,938	23,008	259,772
ACREAGE IRRIGATED									
CLASSIFIED BY SOURCE OF WATER SUPPLY.									
38	Supplied from streams.....	661,762	35,014	7,234	31,393	177,509	13,240	13,951	206,983
39	By gravity.....	661,239	35,007	7,070	31,120	177,509	13,240	13,951	206,983
40	By pumping.....	463	7	155	273				
41	Supplied from lakes.....	906				500			
42	By gravity.....	500				500			
43	By pumping.....	406							
44	Supplied from wells.....	187	100	38			1		6
45	Flowing.....	150	100	38					6
46	By pumping.....	37					1		6
47	Supplied from springs.....	38,840		844	788	5,453	770	4,704	764
48	Supplied from reservoirs.....	138							
49	Total acreage supplied by pumping.....	906	7	155	273		1		6
IRRIGATION ENTERPRISES									
50	Independent enterprises..... number.....	1,347	22	28	128	341	34	57	205
51	<i>Number in 1899.....</i>	<i>1,498</i>	<i>81</i>	<i>(1)</i>	<i>109</i>	<i>508</i>	<i>43</i>	<i>67</i>	<i>287</i>
52	Per cent of increase, 1899-1910.....	210.1	20.0		17.4	14.3	20.9	14.0	13.5
53	Main ditches..... number.....	994	17	32	142	172	30	36	190
54	<i>Number in 1899.....</i>	<i>1,498</i>	<i>81</i>	<i>(1)</i>	<i>109</i>	<i>508</i>	<i>43</i>	<i>67</i>	<i>287</i>
55	Per cent of increase, 1899-1910.....	33.0	45.2		30.3	56.8	9.3	46.3	16.0
56	Length..... miles.....	1,938	78	65	213	211	85	55	379
57	<i>Length in 1899.....</i>	<i>2,850</i>	<i>156</i>	<i>(1)</i>	<i>190</i>	<i>669</i>	<i>44</i>	<i>111</i>	<i>455</i>
58	Per cent of increase, 1899-1910.....	32.2	42.2		12.1	68.5	93.2	50.5	16.7
59	Capacity..... cubic feet per second.....	17,570	1,656	203	1,688	1,520	236	280	3,368
60	Laterals..... number.....	1,531	78	30	24	803	8	23	66
61	Length..... miles.....	1,213	191	12	17	200	25	15	102
62	Reservoirs..... number.....	109	2	5	4	9		21	15
63	Capacity..... acre-feet.....	325,953	300,010	7	5,043	3,007		1,014	5,283
64	Flowing wells..... number.....	19	2	6					
65	Capacity..... gallons per minute.....	1,302	54	1,210					
66	Pumped wells..... number.....	6					1		3
67	Capacity..... gallons per minute.....	1,349					5		1,076
68	Pumping plants..... number.....	18	1	4	2		1		3
69	Engine capacity..... horsepower.....	693	8	72	100		2		303
70	Pump capacity..... gallons per minute.....	24,205	490	6,750	4,000		5		1,076
COST									
71	Cost of enterprises up to July 1, 1910..... dollars.....	6,721,924	1,621,996	61,069	64,696	384,086	137,092	25,396	556,998
72	<i>Cost in 1899.....</i>	<i>1,687,659</i>	<i>40,791</i>	<i>(1)</i>	<i>43,713</i>	<i>249,460</i>	<i>22,916</i>	<i>69,115</i>	<i>466,334</i>
73	Per cent of increase, 1899-1910.....	337.2	3,876.4		48.0	54.0	498.2	33.3	19.4
74	Average cost per acre enterprises were capable of irrigating in 1910..... dollars.....	7.99	38.06	3.62	1.82	2.03	9.72	1.16	2.43
75	<i>Average cost per acre irrigated in 1899.....</i>	<i>8.05</i>	<i>1.38</i>	<i>(1)</i>	<i>1.69</i>	<i>1.69</i>	<i>3.71</i>	<i>3.17</i>	<i>3.73</i>
76	Estimated final cost of existing enterprises..... dollars.....	12,188,756	7,016,828	67,000	64,696	385,096	150,092	25,396	608,998
77	Average per acre included in projects..... dollars.....	9.89	134.86	3.04	1.72	1.47	5.06	1.08	2.00
OPERATION AND MAINTENANCE									
78	Acreage for which cost is reported.....	88,976	28,140	4,503					10,520
79	Total cost reported..... dollars.....	86,110	15,543	12,978					17,050
80	Average per acre for which cost is reported..... dollars.....	0.97	0.55	2.88					1.62
81	<i>Average cost per acre in 1899.....</i>	<i>0.18</i>							
82	Per cent of increase, 1899-1909.....	438.9							

¹ Clark County organized from a part of Lincoln County in 1909.

² Decrease.

³ Irrigated acreage includes wild grass, while improved land in farms does not.

⁴ Figures relate only to systems obtaining water from streams.

⁵ Total cost shown for state includes \$3,632, representing the cost of well systems, which was not reported by counties. County figures relate only to systems obtaining water from streams.

⁶ Not reported by counties. Figures relate only to systems obtaining water from streams.

IRRIGATION—NEVADA.

ACREAGE IRRIGATED, EXTENT AND COST OF IRRIGATION ENTERPRISES, AND COST OF OPERATION AND MAINTENANCE, BY COUNTIES: 1909 AND 1910.

[Comparative data for 1899 in italics.]

	Lander.	Lincoln. ¹	Lyon.	Nye.	Ormsby.	Storey.	Washoe.	White Pine.
1 Number of all farms in 1910.....	55	135	208	116	45	21	367	203
2 Number of farms irrigated in 1909.....	54	113	196	103	39	19	326	164
3 Per cent of all farms.....	98.2	83.7	94.2	91.4	86.7	90.5	88.8	80.8
4 <i>Number of farms irrigated in 1899.....</i>	<i>68</i>	<i>205</i>	<i>161</i>	<i>30</i>	<i>59</i>	<i>21</i>	<i>515</i>	<i>148</i>
5 Per cent of increase, 1899-1909.....	20.6		21.7	32.5		9.5	4.2	10.8
LAND AND FARM AREA								
6 Approximate land area..... acres.....	3,661,440	6,727,040	965,760	11,708,100	99,840	180,640	4,000,640	5,628,800
7 Land in farms..... acres.....	249,736	29,958	105,562	94,614	10,472	1,498	195,286	100,631
8 Improved land in farms..... acres.....	61,913	12,045	43,806	41,576	2,959	759	57,015	77,833
9 Acreage irrigated in 1909.....	23,842	9,907	32,143	19,978	2,426	891	50,904	32,795
10 Per cent of total land area.....	0.6	0.1	6.4	0.2	2.4	0.6	1.3	0.6
11 Per cent of land in farms.....	9.3	33.1	58.9	21.1	28.2	59.5	26.1	28.9
12 Per cent of improved land in farms.....	37.7	82.3	141.9	48.1	82.0	117.4	89.3	42.1
13 <i>Acreage irrigated in 1899.....</i>	<i>18,303</i>	<i>9,962</i>	<i>32,422</i>	<i>12,666</i>	<i>1,663</i>	<i>690</i>	<i>43,885</i>	<i>19,566</i>
14 Per cent of increase, 1899-1909.....	24.1		91.7	57.7	55.2	20.1	16.0	99.3
15 Acreage enterprises were capable of irrigating in 1910.....	24,085	15,391	116,222	28,902	2,466	925	54,551	49,229
16 Acreage included in projects.....	54,285	16,124	260,354	34,062	2,466	1,025	82,600	52,918
ACREAGE IRRIGATED AND INCLUDED IN PROJECTS								
CLASSIFIED BY CHARACTER OF ENTERPRISE.								
17 U. S. Reclamation Service, irrigated in 1909.....			1,675			185		
18 Enterprises were capable of irrigating in 1910.....			54,675			185		
19 Included in projects.....			171,455					
20 U. S. Indian Service, irrigated in 1909.....							116	
21 Enterprises were capable of irrigating in 1910.....							800	
22 Included in projects.....							3,500	
23 Carey Act enterprises, irrigated in 1909.....								
24 Enterprises were capable of irrigating in 1910.....								
25 Included in projects.....								
26 Irrigation districts, irrigated in 1909.....								
27 Enterprises were capable of irrigating in 1910.....								
28 Included in projects.....								
29 Cooperative enterprises, irrigated in 1909.....		1,857	29,507	3,126			14,489	1,900
30 Enterprises were capable of irrigating in 1910.....		1,990	30,554	3,126			15,359	2,100
31 Included in projects.....		2,448	43,426	5,396			17,810	2,500
32 Commercial enterprises, irrigated in 1909.....							8,864	
33 Enterprises were capable of irrigating in 1910.....							9,300	
34 Included in projects.....							24,500	
35 Individual and partnership enterprises, irrigated in 1909.....	23,342	8,050	30,966	19,852	2,426	700	27,435	30,895
36 Enterprises were capable of irrigating in 1910.....	24,085	13,401	30,993	25,770	2,466	740	20,092	47,129
37 Included in projects.....	54,285	13,676	45,473	28,066	2,466	840	36,781	50,413
ACREAGE IRRIGATED								
CLASSIFIED BY SOURCE OF WATER SUPPLY.								
38 Supplied from streams.....	22,648	1,417	62,123	11,382	1,942	833	49,735	26,208
39 By gravity.....	22,648	1,395	62,123	11,380	1,942	833	49,731	26,208
40 By pumping.....		22		2			4	
41 Supplied from lakes.....							400	
42 By gravity.....								
43 By pumping.....							400	
44 Supplied from wells.....	12	10						20
45 Flowing.....	12							
46 By pumping.....		10						20
47 Supplied from springs.....	682	8,480	25	8,596	404	58	705	6,507
48 Supplied from reservoirs.....					80		58	
49 Total acreage supplied by pumping.....		32		2			410	20
IRRIGATION ENTERPRISES								
50 Independent enterprises..... number.....	60	51	59	101	30	17	99	106
51 <i>Number in 1899.....</i>	<i>117</i>	<i>72</i>	<i>43</i>	<i>93</i>	<i>20</i>	<i>18</i>	<i>72</i>	<i>172</i>
52 Per cent of increase, 1899-1910.....	48.7		37.2	8.6	50.0	5.6	37.5	38.4
53 Main ditches..... number.....	70	26	56	65	11	6	43	80
54 <i>Number in 1899.....</i>	<i>117</i>	<i>72</i>	<i>43</i>	<i>93</i>	<i>20</i>	<i>18</i>	<i>72</i>	<i>172</i>
55 Per cent of increase, 1899-1910.....	40.2		30.2	30.1	57.7	66.7	40.3	53.5
56 Length..... miles.....	118	37	280	83	7	10	208	100
57 <i>Length in 1899.....</i>	<i>261</i>	<i>83</i>	<i>199</i>	<i>193</i>	<i>26</i>	<i>33</i>	<i>279</i>	<i>182</i>
58 Per cent of increase, 1899-1910.....	54.8		45.2	57.0	73.0	69.7	25.4	45.1
59 Capacity..... cubic feet per second.....	2,654	78	4,014	147	28	51	1,104	543
60 Laterals..... number.....	29	16	269	91	12	1	17	64
61 Length..... miles.....	13	10	520	34	4	1	20	40
62 Reservoirs..... number.....	8	2	4	13	6		8	12
63 Capacity..... acre-feet.....	1	3	2	1,083	203		10,277	20
64 Flowing wells..... number.....	11							
65 Capacity..... gallons per minute.....	38							
66 Pumped wells..... number.....	1							1
67 Capacity..... gallons per minute.....	196							72
68 Pumping plants..... number.....	2			1			3	1
69 Engine capacity..... horsepower.....	10			1			193	4
70 Pump capacity..... gallons per minute.....	588			10			11,304	72
COST								
71 Cost of enterprises up to July 1, 1910..... dollars.....	188,431	39,262	2,761,261	56,871	11,620	16,270	678,284	118,642
72 <i>Cost in 1899.....</i>	<i>45,273</i>	<i>32,814</i>	<i>146,273</i>	<i>43,750</i>	<i>8,650</i>	<i>7,400</i>	<i>292,400</i>	<i>61,716</i>
73 Per cent of increase, 1899-1910.....	332.2		1,787.7	16.7	34.3	119.9	132.0	92.2
74 Average cost per acre enterprises were capable of irrigating in 1910, dollars.....	7.82	2.55	23.76	1.97	4.71	17.59	12.43	2.41
75 <i>Average cost per acre irrigated in 1899.....</i>	<i>2.32</i>	<i>3.20</i>	<i>4.51</i>	<i>3.23</i>	<i>5.63</i>	<i>10.72</i>	<i>6.66</i>	<i>3.19</i>
76 Estimated final cost of existing enterprises..... dollars.....	188,431	39,262	2,761,261	56,871	11,620	16,270	678,284	118,642
77 Average per acre included in projects..... dollars.....	3.47	2.44	10.61	1.67	4.71	15.87	8.21	2.24
OPERATION AND MAINTENANCE								
78 Acreage for which cost is reported.....			26,393				17,520	1,900
79 Total cost reported..... dollars.....			25,761				13,588	1,190
80 Average per acre for which cost is reported..... dollars.....			0.98				0.78	0.63
81 <i>Average cost per acre in 1899.....</i>								
82 Per cent of increase, 1899-1909.....								

¹ Clark County organized from a part of Lincoln County in 1909.

² Decrease.

³ Irrigated acreage includes wild grass, while improved land in farms does not.

⁴ Figures relate only to systems obtaining water from streams.

⁵ Not reported by counties.